

Government Econometrics: Science or Politics?

Virtually every government agency is using models to do forecasting today, but how much of the modelers' efforts ever show up in policy decisions is a real question.

Political, social and psychological considerations often carry more weight than the results of econometric models in the decision making process, many government economists have noted.

At the same time, some said, models are sometimes altered or "tinkered with" in order to produce results that reflect policymakers' expectations.

"We use models for such things as estimating interest on the public debt or estimating unemployment and trust fund outlays and receipts. We also produce the budget on what is in essence a model," said Carey Modlin, deputy assistant director for budget review in the

Office of Management and Budget.

"But in the end," he remarked, "our judgments are determined by a political system."

Modlin explained it's "much too difficult to quantify some of the facts that would have to be fed into a model - like whether the President was feeling good when he got up in the morning."

"I don't mean to sound quite so facetious," he added, "but these are the sorts of things that affect decisions, and these are the fabric of our institutions."

Moreover, "how the hell do you quantify something like national prestige? You can't," he said.

The Economic Policy Board, headed by Treasury Secretary William Simon, makes extensive use of models to test policy ideas. Some of the

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IBM Cleared of Telex Case Monopoly Charges

• Judge Defined Market Wrong

By E. Drake Lundell Jr.
Of the CW Staff

DENVER - The key to the Tenth Circuit Court of Appeals' reversal of the antitrust judgment against IBM in the Telex case lies in the area of market definition, a thorny but critical issue in any antitrust case.

It is this phase of antitrust cases that determines the boundaries of the market against which to judge the size of the various competitors.

In this case, Telex claimed the relevant market was the one for peripheral equipment that attaches to IBM computers, while IBM argued the entire systems market should be considered - or at least the market for all peripheral equipment, whether used with IBM equipment or with the CPUs of other mainframe makers.

And, even though it noted "market definition is generally treated as a matter of fact and that findings on this subject are not to be overturned unless clearly erroneous," the appeals court overturned the lower court finding of a limited market in favor of the broader market definition put forth by IBM.

First the appeals court found that "IBM's share of the data processing industry as a whole is insufficient to justify an inference or conclusion of market power."

Therefore the major question to be answered, the court said, was whether there was an identifiable submarket made up solely of IBM-compatible peripheral equipment.

Christensen Overruled

In the lower court, Judge A. Sherman Christensen found there was clearly a submarket within the computer industry made up of competitors selling IBM plug-compatible peripheral equipment.

Christensen, after reviewing the industry, had found that as a practical matter there is no direct competition between IBM peripherals and the peripherals of other systems manufacturers.

However, the appeals court said, several

(Continued on Page 5)

Lower Court Overturned

DENVER - In a wide-ranging ruling absolving IBM from monopoly charges, the Tenth Circuit Court of Appeals here has completely reversed the \$259.5 million awarded to Telex Corp. in its suit with IBM.

In making the finding, the appeals court said Judge A. Sherman Christensen, who made the original award to Telex, erred in his definition of the market and that IBM practices were just competitive, not predatory.

At the same time the appeals court essentially upheld the lower court's finding that Telex "misappropriated and pirated" trade secrets of IBM, but reduced the amount of damages from the original \$21.9 million to \$17.5 million.

Telex immediately said it would appeal the ruling, either to the entire Tenth Circuit Court of Appeals or to the Supreme Court directly. The decision can be taken back to the seven-

man appeals court, since the original appeal was heard by only three members of that court, who were unanimous in their findings.

Not Giving Up

"Just because you lose a battle you don't give up the war," a spokesman for Telex indicated.

The reaction on the other side of the fence was more jubilant, but just as predictable.

"We are all very pleased that the appeals court overturned the lower court's decision and found that IBM has not violated the antitrust laws," said Frank T. Cary, IBM board chairman.

The reaction of Wall Street to the ruling was stunning, with some analysts crediting it with the stock market's record trading session the first business day after it was announced.

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• Tactics Ruled Not Predatory

By E. Drake Lundell Jr.
Of the CW Staff

DENVER - The IBM actions in the peripherals marketplace "constituted valid competitive practice and were neither predatory nor otherwise violative of the antitrust acts," the Tenth Circuit Court of Appeals ruled here last week.

As the second part of its attack on the ruling against IBM by District Court Judge A. Sherman Christensen, the appeals court said the IBM actions Christensen found to be predatory conduct were nothing more than good business practice in the computer industry.

Christensen had ruled the IBM 2319A and B disk drives, the Extended Term Lease Plan and the Fixed Term Lease Plan constituted predatory practices on the part of IBM.

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FCC Restricts IBM Satellite Venture

By Ronald A. Frank
Of the CW Staff

WASHINGTON, D.C. - The Federal Communications Commission (FCC) has ruled IBM may enter the satellite communications business under certain guidelines that would prevent it from limiting competition.

The FCC ruling requires that the IBM satellite venture "shall permit reasonable and nondiscriminatory interconnection of customer-provided communications systems and/or terminal equipment with its services and facilities."

The commission further said the IBM parent company "shall not sell or promote directly or indirectly communications services of any system in which its separate satellite corporate entity participates."

The FCC decision was technically a response to a request from IBM and Comsat General to restructure CML Satellite Corp. The request concerned a proposal to include IBM in the restructured firm with a majority interest and voting control.

"The commission decided that the public interest would not be served by granting the petition as proposed," the FCC said, but "neither IBM nor Comsat should be disqualified as a domestic satellite applicant."

Several Alternatives

The FCC gave both IBM and Comsat several alternatives to enter the satellite business. It said both firms can enter alone or Comsat can enter without IBM in another multiple company arrangement.

But if IBM and Comsat participate as partners, the FCC ruled, they will have to include "another corporate partner(s) upon condition that no partner shall have less than a 10% ownership interest or more than a 49% ownership interest or otherwise be in a position whereby it could exercise de facto control."

The FCC decision had the effect of providing guidelines to IBM for conditions under which it can apply for authorization to enter the satellite business. If IBM and Comsat reach agreement on the

alternatives raised by the FCC, a more specific application will have to be filed with the commission, according to an FCC staff source.

Such a filing would then be subject to the FCC hearing process and the merits of the application would have to be decided, he said.

Although this is procedurally correct, industry observers see the FCC's alternatives as indicating the commission would approve an IBM satellite company as long as the guidelines were met.

Answers Objections

The requirements for the interconnection of non-IBM equipment and for separation of the IBM parent company from a satellite subsidiary appeared to answer objections raised by several firms. At oral arguments before the FCC last November, several firms warned IBM could dominate the satellite business unless the FCC attached these types of safeguards.

IBM and Comsat General filed a request with the FCC last July to restructure

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Econometrics in Government a Science?

(Continued from Page 1)

models used by the board include the Wharton model, the Data Resources, Inc. (DRI) model, the Chase Econometrics model and the Commerce Department's Bureau of Economic Analysis model.

The Economic Policy Board, referred to as "Troika One" in previous administrations, also includes the head of the Office of Management and Budget, the head of the Council of Economic Advisors and several other White House staff members. The group has provided Presidents with economic policy advice for about a decade.

In developing policy recommendations, the board combines heavy doses of judgment with its use of econometrics.

"When the tax cut for economic stimulus was proposed, we ran that on our models, but we also used a judgmental approach," Edgar Fiedler, the Treasury Department's assistant secretary for economic policy, said.

When asked how the board actually might use a model, Fiedler explained, "If a proposal doesn't prove out as expected when we run it, sometimes we change the model."

On the other hand, "we might bypass part of the model and use our own judgment on one aspect of it. We do this by adjusting the model, either ad hoc or in the formal change of an equation," he said.

Facts, Not Intuition

While some critics say decision making is based on intuition as much as anything else, Lawrence Klein, economics professor at the University of Pennsylvania's Wharton School and one of the originators of the Wharton model, disagrees.

"They're probably using facts more than intuition," he said. "The distinction is probably more in whether you use them in a formal model or in an informal judgmental process."

Conflicts over basic assumptions are often at the heart of disagreements between modelers and policymakers. One particular disagreement between the Economic Policy Board and Otto Eckstein, a Harvard University professor and president of DRI, centers on the effect of President Ford's proposed oil tariffs on the rate of inflation.

Eckstein, who contends the price increase will cause inflation to rise as much as 4%, simulated the effect of the tariff on a model with a secondary price impact operating through the wage, which in turn, placed upward pressure on prices.

Fiedler disagreed with Eckstein's model, claiming the secondary price impact cannot be assumed.

"Money taken out of the consumers' pocket through the energy tariff will be put back in another pocket by means of an income tax cut," with no effective change in the cost of living for the average family, Fiedler explained.

And, he added, "with unemployment approaching 8%, labor market conditions just aren't conducive for demanding an

increase in pay."

In its role of manipulating credit conditions and the money stock by changing the discount rate or reserve requirements for banks, the Federal Reserve Board uses econometric modeling — but often after the fact, according to Jared Enzler, senior economist for the board.

"We get requests to try out different monetary policies to see whether they make sense. We might also get requests to simulate the effects of the energy program, to evaluate things that haven't happened or things that have happened, such as the dollar devaluation, oil price increase and the effect of price controls," he said.

This series was prepared by CW staffers Nancy French, Edith Holmes and Patrick Ward.

The Federal Reserve Board runs its simulations on a model it developed jointly with the Massachusetts Institute of Technology and the University of Pennsylvania, but often its work has little impact on decision making because it is not forewarned of policy changes, according to Enzler.

"For example, when price controls were imposed during the Nixon administration, we were not informed ahead of time," he said.

"Other times we run analyses of things and send them to the Board of Governors, and they in turn will pass them on to people in the administration."

Enzler, too, warned that interpreting the results of simulations can be a tricky business.

"The model consists of a lot of behavioral equations," he explained. "If we're going to do a forecast, we will do two things: first, look at each behavioral equation and its recent pattern of errors, and then come to some judgment about what we think the future pattern of errors is likely to be."

"We then code past error patterns right into the solution," he said.

Modeling effectiveness breaks down when the rules of the game change, Enzler pointed out.

A typical example is an equation that predicts time deposits, he said. "That was always a pretty stable number until three or four years ago, when the regulations were changed and rates on passbook time deposits began to vary all over the map."

"Pretty soon, we didn't have a good number to put into our time-deposit equation any more," he said.

Providing still another link in the policy chain, the Constitution's system of checks and balances assures input on economic policy decisions from Congress.

While Congress has been described by many as "still in the Stone Age when it comes to using computers and modeling," Congressional committees with economic policy responsibilities employ the econometricians from the same organizations as do the President's economic advisors, namely, the Wharton Model, DRI, Chase Econometrics and the Brookings Institu-

tion, according to Douglas Lee, staff economist for the Joint Economic Committee.

"We use models to review monetary policy, taxation and the budget and the economic report of the President," Lee said. "We simulate our recommendations and forecast the results before making them."

But congressional committees also rely to a large extent on the hearings procedure where testimony is taken from experts; economists Gardner Ackley, Paul McCracken and Charles Schultz have been among those who testified recently. They also hear the views of labor, representatives of bankers and businessmen, Lee explained.

However, after committees hear testimony, and make recommendations to the full houses, each congressman weighs the information on the basis of his own opinions, political philosophy and his state's specific interests.

While models have played a rather limited role in actual decision making in government, many industrialists are using them with more success.

Just how close is the resemblance between forecasts made using models and what eventually happens in the economy? In the next part of this series, Computerworld will examine the performance of models and simulation from the points of view of users in industry.

IBM Satellite Entry Gets FCC Restrictions

(Continued from Page 1)

CML Satellite Corp., a firm which originally included Comsat General, MCI and Lockheed as partners. The three companies each held a one-third ownership in CML; the restructuring would have given Comsat General 45% and IBM 55% of the proposed company.

Either IBM or Comsat could now reject the FCC decision. But it is more likely that the firms will file an application implementing one of the alternatives raised by the FCC.

Both IBM and Comsat said they had no statement to make on the FCC's decision. IBM said it is waiting for the full text of the decision to be released. An FCC spokesman said the document would be issued by this week.

Commenting on the FCC decision, A.G.W. Biddle, executive director of the Computer Industry Association (CIA), said, "I am still doubtful that the FCC fully understands the sophistication of IBM when it comes to achieving [its] objectives in spite of [the FCC] ruling. But at least it's a step forward."

Biddle said the CIA does not object to IBM's entry and never has, but if it takes place then "we ask that it be on an open basis without any predatory practices or market-restricting techniques used."

"However, we prefer to see [IBM's entry] not happen," Biddle added.

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Three Years of Court Action Preceded Telex Reversal

By Edith Holmes

Of the CW Staff

DENVER — After months of waiting, those concerned with the outcome of the appeal in the Telex vs. IBM antitrust case finally have their answer.

The reversal has brought with it, too, a brief respite before the case enters its third and final round in the courts and a moment for reflection on the three years of litigation leading up to this decision in favor of IBM.

The following are the major events that preceded this decision by the Tenth Circuit Court of Appeals.

Feb. 2, 1972: Telex Corp. files suit in the U.S. District Court in Tulsa, Okla. calling for the breakup of IBM "as a single entity monopolizing and controlling the EDP industry."

Mar. 29, 1972: Telex updates its \$875 million antitrust suit with a request for temporary and permanent injunctions barring IBM from offering extended-term

leases to Telex customers and from renewing any of its present fixed-term leases on their expiration.

Sept. 11, 1972: Judge Philip Neville of the U.S. District Court for the District of Minnesota in St. Paul hears Telex's motion for a preliminary injunction preventing IBM from marketing its equipment on extended-term and fixed-term plans and IBM's motion for a summary judgment in the antitrust case.

Oct. 18, 1972: The Minn. district court denies both IBM's motion for a summary judgment and Telex's motion for a preliminary injunction.

Jan. 24, 1973: Telex asks the district court in St. Paul to set aside the out-of-court settlement made in an antitrust suit brought by Control Data Corp. (CDC) against IBM because "CDC in conjunction with IBM... destroyed CDC's data base," thus preventing Telex from pursuing its suit with IBM.

Jan. 31, 1973: IBM sues Telex for misappropriation of IBM trade secrets and asks the court for \$25 million in damages.

Feb. 7, 1973: IBM files suit against Telex charging breach of a 1966 patent agreement and asking for payment to IBM of royalties due under the agreement. Telex, meanwhile, claims this suit is intended to divert attention from the antitrust case.

Feb. 21, 1973: The district court in Minnesota denies the Telex motions to set aside part of the out-of-court settlement between CDC and IBM and to find IBM and CDC in contempt of court for destroying the index to documents pre-

pared by CDC.

Apr. 16, 1973: Telex vs. IBM goes to trial.

June 18, 1973: All testimony in the antitrust case between Telex and IBM has been heard and oral summations of the arguments begin. Judge A. Sherman Christensen decides not to issue a temporary judgment immediately after the conclusion of the arguments because of the complexities of the case.

Sept. 17, 1973: Judge Christensen finds IBM guilty of monopolization of the plug-compatible peripherals market and Telex guilty of the charge of misappropriating trade secrets. IBM is fined \$352.5 million and Telex is ordered to pay over \$21.9 million.

In addition, IBM complies with one of the provisions in Judge Christensen's decision by suspending collection of penalty charges under the fixed-term, extended-term and long-term lease plans.

At the same time, IBM also stipulates that if a higher court later reverses the district court ruling, IBM will collect these charges retroactively.

Sept. 27, 1973: IBM and Telex file motions seeking to amend the judgments made against each of them by the district court. Telex requests Judge Christensen set the trial date for the case the peripherals manufacturer wants to bring against

IBM on monopolization in the international market.

Oct. 10, 1973: Judge Christensen admits his computation of the antitrust damages against IBM involved substantial error. He sets a new hearing date for consideration of the fines.

Oct. 16, 1973: Judge Christensen sets aside his \$352.5 million judgment for Telex.

Nov. 9, 1973: The damages to be paid by IBM are reduced by the court by \$93 million. IBM must now pay \$259.5 million, three times the actual damages of \$86.5 million found for its domination of the plug-compatible peripherals market.

IBM's appeal of the antitrust case goes to the Tenth Circuit Court of Appeals in Denver. The definition of predatory pricing becomes crucial to both parties in the case.

May 14, 1974: IBM and Telex complete the deliveries of their now-familiar arguments in the case before the appeals court. A decision on the case is expected by all momentarily...

Jan. 24, 1975: The Denver appeals court reverses the decision of the lower court on the basis of the arguments in IBM's counterclaim. Telex is fined \$18.5 million in compensatory and punitive damages on the theft of trade secrets charges.

IBM Tactics Ruled Not Predatory

(Continued from Page 1)

He reached this conclusion based on a study of the internal IBM documents that outlined how the firm had studied and measured competition in order to gauge the competitive reaction to its price cuts and leasing plans.

After what was called a " cursory " study of the same documents by the appeals court, however, the higher court reached a different conclusion.

Claiming that "the view of the authorities taken by the trial court is an extremely narrow one," the appeals court said the lower court ruling "ignores two factors.

"The first factor is whether or not the acts are ordinary business practices typical of those used in a competitive market and secondly whether the acts constitute the use of monopoly power."

The court indicated "it is obvious that the reduction in prices by IBM resulted in price reduction by others in the market... The reduction was a disturbance in the price structure."

'Ordinary Market Methods'

However, the appeals court also noted IBM expected a reasonable profit from the products on which it had cut prices.

"The 'acts' found by the trial court to be illegal were ordinary marketing methods available to all in the market," the appeals body said.

Because of this "there is no use of price reduction by an economic giant to drop prices to a level where it is not receiving an adequate return and must instead rely on its reserves or other activities to continue producing and marketing the particular product.

"Instead in the case before us... the particular products of IBM here considered stood on their own feet as to financial returns. Furthermore it was also demonstrated that IBM's costs were above others in the market.

"The record shows, during the period under consideration, that the parties and others in the market produced more advanced products better suited to the needs of the customers at lower prices," the court added.

Even a firm with a monopoly position in the market "must" have "some room to move" when it sees its market share being eroded by those who market copies of its products, the court said.

The antitrust laws, according to the court, "were not intended to... prohibit

The Judges

DENVER — A look at the three-man appeals court panel which decided the IBM-Telex appeal reveals a varied political background.

Two of the judges were originally appointed to the federal bench during the Kennedy administration, when Nicholas Katzenbach, now IBM general counsel, was active in the Department of Justice. The third received his initial appointment to the federal bench during the Nixon years.

Oliver Seth, 59, was a director of the Santa Fe (N.M.) National Bank and counsel for the N.M. Bankers Association when he was appointed to the Tenth Circuit Court of Appeals in 1962.

Appointed a district court judge in 1961, William E. Doyle, 64 today, was elevated to the appeals court in 1971 under Nixon, even though he is listed as a Democrat politically. Previously he was an associate justice of the Colorado Supreme Court.

Robert H. McWilliams, 58, also came from the Colorado Supreme Court, where he had been chief justice until his appointment to the Tenth Circuit Court of Appeals in 1970. He is listed as a Republican.

the adoption of legal and ordinary marketing methods already used by others in the market or to prohibit price changes which are within a 'reasonable' range, up or down."

On the issue of predatory practice, the appeals court said "the term probably does not have a well-defined meaning in the context it was used [in the original decision], but it certainly bears a sinister connotation."

In ruling the characterization invalid, the appeals court said "the record demonstrates that these acts of IBM are again part of the competitive scene in this volatile business inhabited by aggressive, skillful businessmen seeking to market a product cheaper and better than that of their competitors.

"It is IBM's participation in this marketing that the trial court termed 'predatory,' but the record shows this was no more than engaging in the type of competition prevalent throughout the industry," the appeals court said.

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Judge's Definition of Market Overturned by Appeals Court

(Continued from Page 1)

witnesses had indicated that it was relatively easy to design interfaces for peripherals so they could work with different systems.

"Manufacturers of peripherals were not limited to those which were plug-compatible with IBM CPUs," the appeals court declared.

"These manufacturers were free to adapt their products through interface changes to plug into non-IBM systems. It also followed that systems manufacturers could modify interfaces so that their own peripheral products could plug into IBM CPUs," the appeals body said.

"Factually, then, there existed peripheral products of other CPU manufacturers which were competitive with IBM peripherals and unquestionably other IBM peripherals were capable of having their interfaces modified so that their peripheral products would plug into non-IBM's [sic] CPU.

"The fact that Telex had substantially devoted itself to the manufacture of peripheral products which were used in IBM CPUs and which competed with IBM peripheral products cannot control in determining product market since the legal standard is whether the product is reasonably interchangeable," the court added.

'Reasonable Interchangeability'

Because of this "reasonable interchangeability" among peripherals of all different manufacturers of computer equipment, the court ruled there was no separate market for IBM-compatible devices.

"The market should include not only

Telex Case Reversed

(Continued from Page 1)

IBM stock boomed, opening \$25 ahead of its previous mark and settling back to "just" \$20 ahead at the end of the first day it was traded after the ruling.

Telex, however, fared poorly in the hands of investors and the New York Stock Exchange had not even opened trading on it by the middle of last week, with rumors circulating that Telex would be delisted from the big board.

CDP Exam Registration Up

CHICAGO - Registration for the Feb. 15 Certificate in Data Processing (CDP) exam has increased by more than 20% over last year, according to the Institute for Certification of Computer Professionals (ICCP).

Sharon Kay Bennett, certification coordinator for the ICCP, reported 2,363 CDP candidates had registered by Jan. 10. Last year, 1,971 candidates took the exam and 448 were awarded the CDP.

This is the first year the exam will be administered by the ICCP. Further information can be obtained from the institute at P.O. Box 1442, 60690.

Correction

The monthly charge for the small hospital Industry Application Program (IAP) for IBM's System/32 [CW, Jan. 15] is \$98, according to an IBM source.

peripheral products plug-compatible with IBM CPUs, but all peripheral products, those compatible not only with IBM CPUs but those compatible with non-IBM systems," the panel said.

"This is wholly justifiable because the record shows that these products, although not fungible, are fully interchangeable and may be interchanged with minimal financial outlay, and so cross-elasticity exists."

The lower court's "very restrictive definition of the product market in the face of evidence which established the interchangeable quality of the products in question, together with the existence of cross-elasticity of demand, must be regarded as plain error," the appeals judges said.

"This fundamental misconception affected the remainder of the [lower] court's decision," the panel ruled.

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Privacy Act Will Change Agencies' Data Practices

By Nancy French
Of the CW Staff

WASHINGTON, D.C. — Despite the compromises that stripped the Privacy Act of 1974 to bare bones, the new law will change the way government agencies collect, disseminate and maintain personal information on U.S. citizens in manual as well as computerized files.

A transcript of the version of S.3418 that actually passed both houses of Congress, made available last week, indicated the Administration view prevailed.

Gone are the provisions that would have protected citizens from privacy abuses by the private sector.

Omitted were the provisions that would have protected individuals from violations of privacy arising from use of incomplete "rap sheets" in the Federal Bureau of Investigation's Computerized Criminal History Files.

Compromised out of the bill was a federal privacy commission with full enforcement powers.

What the bill does provide are minimum standards for the collection and processing of personal information by federal agencies.

Under the law, federal agencies are required to permit an individual to examine records pertaining to him and to correct or amend these records.

This can be done through the mail, and agencies must respond to such an inquiry within 30 days in some cases. Disputes will be resolved in court.

Agencies are required to "assure accuracy, currency and security" of records and limit recordkeeping activities to "necessary and lawful purposes." They are subject to civil suits for "willful or intentional" violations of individual rights under the act.

The law permits "routine use" of personal records, in other words, all uses compatible with the purposes for which the records were originally collected.

Access to personal records can be granted to other agencies in connection

with law enforcement activities under prescribed conditions and even to individuals when the health and safety of an individual is involved.

Analysis

Public access can be granted where required by the Freedom of Information Act, and that includes cases "where such records have been made available in the past," still a gray area.

Unless an individual gives his consent, however, agencies may not disclose his personal records to anyone other than officers within the same agency which collected them.

Personal information may also be released for statistical purposes, provided the individual's identity cannot be surmised.

Each agency is required to keep records

of all disclosures of personal records and make that information available to the individuals whose records have been disclosed. In addition, if a correction has been made to a record after it has been released, the agency must notify the group to which it was released.

In addition, the law limits recordkeeping to that which is "relevant and necessary."

It requires that individuals who are asked to provide personal information be informed of the authority behind the request, the purpose for collecting the information, the uses to which the information will be put and the legal implications of not providing requested information.

The privacy law also requires that descriptions of existing record systems be published by the Office of the Federal Register and be made available to the public.

Under the law, no agency may maintain a record concerning "exercise of First Amendment rights," such as political or religious affiliation.

Further, the law requires each agency to develop its own procedures for compliance.

It permits judicial in camera court inspection of records, de novo court review and both assessment of litigation costs and attorneys' fees and actual damages if damages are proved.

The law provides that agency employees who knowingly and willfully act in violation of this law are guilty of a federal misdemeanor, punishable by a fine up to \$5,000, but no jail sentence.

The list of exemptions to the law includes all Central Intelligence Agency and criminal justice records as well as law enforcement agencies "investigatory" files and records maintained for the protection of the President.

Also exempt are records maintained for statistical purposes, files used to determine eligibility for federal employment and security clearances if such disclosures would violate confidentiality and certain testing materials such as civil service examinations.

Two-Year Commission

Another compromise empowers the Office of Management and Budget (OMB) to develop regulations to implement the bill and provide continuing oversight.

The law also establishes a two-year privacy protection study commission numbering seven members — three appointed by the President and two each appointed by the Speaker of the House and the president of the Senate.

The commission is authorized to study existing public and private record systems and analyze the relationship of such systems to constitutional rights, potential abuses and standards established under the law.

The study commission will also be asked to suggest changes in the laws or regulations promulgated by the OMB or an individual agency.

The commission also has the power to hold hearings, conduct inspections, administer oaths and subpoena witnesses, books or records.

The privacy study commission will be established immediately and the other provisions of the law will become effective Sept. 27.

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Editorials

Higher Review Needed

Now that the 10th Circuit Court of Appeals has overturned the original decision in the Telex vs. IBM antitrust case, there is a definite need for an expeditious review of the case by the U.S. Supreme Court.

The case is clearly one of great import to computer users as well as to the computer industry and therefore deserves such a review at the highest level in the land.

Some have argued that the Supreme Court might not be interested in handling the Telex action because it knows that it will probably have to hear an appeal of the U.S. government case against IBM some time in the future.

Action in that case, however, is a long way in the future. The trial, which is scheduled to start Feb. 18, will last almost a year and the judge may take another year to reach his decision.

The appeals process from that decision could take another two years before a ruling is made by the Court of Appeals. Therefore, it could be at least four to five years before the government's case ever gets to the Supreme Court, if in fact it ever does wind up there.

This delay is inevitable in a case the size of the government action against IBM, but the Supreme Court could clear up some of the confusion and indecision in the minds of both computer users and the industry by making an earlier ruling in the more limited Telex action.

We hope the Supreme Court rises to the challenge with early action on the Telex appeal.

Safeguarding the Options

The Federal Communications Commission (FCC) has set some strict requirements for IBM's entry into the satellite communications business. The commission has told IBM it will have to allow interconnection of non-IBM equipment and its satellite subsidiary must remain free of influence from the parent company.

It remains to be seen how IBM intends to become a satellite company. The details will not be known until the company files a formal application to provide service.

In the meantime, it appears the FCC has taken note of the competitive objections and possible abuses that could accompany an IBM satellite corporation.

There is no doubt the decreased cost of satellite communications will make this type of service more and more attractive to data and other users. And it should be remembered IBM is one of the few corporations prepared to underwrite the cost of a domestic satellite system.

The FCC can assure the entry of an IBM satellite firm that is unable to utilize the wealth and power of its parent company for competitive advantage and, if it does, the entire computer communications industry could benefit. But if the commission fails in this attempt, competition could be diminished, leaving the user fewer options.

When IBM files its application for service, we hope the commission will consider all the alternatives carefully.



**'It's Necessary to Our Free Enterprise System—
The CIA Has to Have SOME Competition...'**

Letters to the Editor

SCDP Thinks Time Has Arrived For ACM to 'Stick Its Neck Out'

The Society of Certified Data Processors (SCDP) is in receipt of a news release from the Association for Computing Machinery (ACM) which outlines six reasons why the Social Security Number (SSN) should not be used as a universal identifier and then goes on to adopt a very weak resolution calling for legislators to produce legislation against the principle.

Where is the draft legislation to back up ACM's soft-spoken demands? Why has this organization of "more than 26,000 computer specialists" not brought its resources to bear in the public interest? Why now, in 1975, should the ACM take an "official" stand to support the known results of the Department of Health, Education and Welfare's subcommittee in 1973?

Why now, when legislators in every legislature of the land have already come up with the position that the SSN as a universal identifier is a no-no, should ACM find it necessary to confirm in print what everybody else already feels?

The key in answering these and other questions which should be asked of ACM can be found on the bottom of its press release: "ACM promotes and provides for the dissemination of technical and nontechnical computing information to its members and the public."

You can disseminate forever, ACM. Do something! Take a stand on something! But don't play it so safe that you will take stands only on popular and approved ideas.

For years, ACM has had a relatively ineffective ombudsman program. As near as we can find out, this ombudsman committee consists of about 15 people, some of whom we know are on the committee merely to obtain ACM's mail.

The ombudsman chairperson has not responded to SCDP's offers of assistance. The ombudsman program is small, reactionary and ineffective when it ought to be large, exploratory and earthshaking.

The public interest demands an effective damper to what is going on. ACM has 26,000 members, it says. Isn't it time ACM stuck its neck out?

Kenniston W. Lord Jr.
President

SCDP
Hudson, Mass.

Consumer Wins Either Way In Battle Over Price Marking

While reading the article titled "Stores Required to Price Items Under Proposed Maryland Law" [CW, Jan. 22], this thought came to mind. Haven't the Maryland legislators ever heard of the free enterprise system and the competition that

goes along with it?

If Store A took all the prices off its merchandise and the consumer didn't like it, he would begin shopping at Store B. Store A would be forced to put the prices back on its merchandise or go out of business.

But if Store A was able to reduce its prices, the consumer would be ahead.

Either way the consumer wins — and without costly legislation. I would say that the consumer need not be protected from his food store but from his legislators.

Alan A. Nichols

Chandler, Ariz.

Readability Principle Missing

In his article entitled "Structured Cobol Needs 'END' Feature" [CW, Jan. 15], Edward Yourdon appears to have ignored the principle of readability.

One of the reasons for using structured programming is to improve the ability to comprehend the program. Yourdon admitted the error proneness of nested IF statements, but he did not mention the fact that they are also more difficult to read.

Both problems can be avoided by merely avoiding nested IF statements. While this at first appears to be a simplistic approach, it fully satisfies the classic flowchart of a decision group.

If Yourdon had simplified his nested example by placing everything on the P-TRUE path in a block called X, his code would be much easier to read and debug. For example:

```
IF P PERFORM X ELSE PERFORM D.
```

```
•
•
•
```

```
X. IF Q PERFORM A ELSE PERFORM B. PERFORM C.
```

By avoiding nested IFs, the program becomes more readily comprehensible and logically dependable — without adding another change to a language that is already changing too rapidly in many respects.

Frank A. Braman

St. Johnsbury, Vt.

Support for New Standards Home

Congratulations to Herb Grosch for his column entitled "A New Home for Standards" [CW, Jan. 15], which was very discerning and long overdue.

I hope the Computer Industry Association (CIA) or the American Federation of Information Processing Societies (Afips) picks up the opportunity.

C. Thomas Deere
Vice-President of Marketing

Data Card Corp.
Minneapolis, Minn.

(Other letters and commentaries on Pages 10, 11 and 12.)

Solid Osmium

It's conventional to refer to a dead weight, an overpowering burden, as leaden, a lump of lead, solid lead. But they taught me in high school that there are a dozen elements much denser — gold, to mention something almost as precious and almost as much in the public eye as oil these days, and platinum, and lots of others. The heaviest, and one of the least useful, is osmium.

And that brings me to Bull, the most burdensome of all computer companies. Solid, unalloyed osmium — so dead a weight, crouching there sullenly on Avenue Gambetta in Paris, as to make lead seem positively pillow-stuffing by comparison.

Many decades ago, Machines Bull was a third force in the international punched card machine business, along with IBM and Rem Rand. Installations surfaced in remote places like Buenos Aires and Algiers — and Tananarive, one imagines! Run as a family enterprise, it followed its competitors reluctantly into drum machines and a large DP system, the Gamma 60. I saw a huge one in 1962 in Paris, doing mostly payroll — for three or four hundred thousand employees and pensioners of the French railroad.

Forced to fight on the marketing battlefield, where it was even less well-equipped than in advanced technology, Bull losses mounted in-

supportably. Much to General de Gaulle's chagrin, no French banking or industrial consortium would bail the company out, and its nonmilitary components were sold to Generous Electric.

I tried to warn GE executives, and especially my old friend Jim LaPierre, against the purchase. Not because GE was already faltering back at the ranch, but because Bull was such an unmaneuverable lump: a second Cross to bear, as it were (insider joke)!

Of course, they went right ahead. And for the next five years Phoenix, Schenectady and New York big shots pulled and hauled and pushed and shoved, to no avail. Finally, due I believe in no small part to the huge and continuing losses from the Bull operation, dumb old GE gave up and — not so dumb at the last — unloaded on Honeywell.

This year we hear again rumors that Bull is on the block. The French national company, Compagnie Internationale D'Informatique (CII), needs bolstering in the Unidata combine against Philips and especially Siemens. How better, than by getting Bull back from the Americans? And Honeywell, of course, would love to unload in turn, if only it could get cash on the barrelhead — and a huge bundle it would have to be!

I suppose the French government could do it.

They've been putting literally billions of francs (*milliards, en Francais*) into CII. But Honeywell must be carrying Bull as a huge asset — what a joke! — on its books. The price would have to be enormous, or the shareholders would string Honeywell Corporate from the nearest lamp post.

As a spectacular way to kill CII, and Unidata, the idea has its attractions. Certainly they need to be put out of their misery, and to fasten a huge lump of Bull osmium around their necks, meanwhile yelling "Swim, swim!" would be great sport. But unless Honeywell gets a ridiculously large packet, the deal might pull it under also. *Mon Dieu, c'est fantastique!*



Herb Gross

New CLA Software Approach Offers S/3 Growth

The range of standard software took a big jump last month when the Computer Lessors Association (CLA) added a new type of independent software to its list.

The software is a conversion package which will enable users of IBM System/3s to move up to the not-much-more-expensive System/30, thereby gaining both more power and access to a greatly increased set of available software and expertise.

The conversion package itself is not available to users, but it is available to all CLA members to help them market the continuously useful IBM 360s. Nor does the package handle all combinations of System/3s, but concentrates on ones for which the conversion is not too difficult and for which the number of systems out in the field is considerable.

These restrictions are natural when you consider the source of the software funding. The CLA's interests are in maximizing the value of its inventory of systems, not in providing openings for later migrations from system to system.

Unlike hardware lessors who have to produce software for the whole of a line or the whole of a conversion, the CLA takes a pragmatic approach to the problem. If a particular conversion is not practical, its guide advises members to "go on to the next prospect."

First Sign

This software package is, I think, the first sign of how the independent world will obtain its software to keep computers going after an initial marketing splurge has passed. It is interesting to recall that the idea of leasing firms forming the nucleus of such an approach would have been laughable a decade ago.

In fact, however, it was in 1965 that IBM made the development almost inevitable by trying to adjust rental prices in order to squeeze the leasing companies out of existence.

At the time, IBM had been offering considerable discounts to people who had paid years and years of rental on systems and then wanted to buy them. There were not too many of these buyers

around — until it was discovered that the then-new leasing companies would finance the purchases and offer leases at less than the IBM rental payments.

In the early 1960s, the practice had grown so much that leased 7090s and 7094s gave an appreciable amount of competition to the new 360.

From an economic point of view, the discount-with-age system was good for IBM. It was like getting paid twice for the same system — once while renting it out in the risk-lease business when the system's newness and scarcity allowed it to command high rates, and then selling it off in the same way that Avis and Hertz sell off their rental cars when they go out of style.

What was unfortunate was that, while the profits were nice, the competition from the discounted systems was too strong for IBM's liking. In 1965, therefore, it abolished the discount-with-age system, arguing that, as computers are immortal, their rental and purchase price should not take into account their length of usage.

An old computer is just as good as a new one, it reasoned, because it works just like a new one and, therefore, would in the future be charged for at the same rate.

IBM's policy has since undergone some slight revisions with fixed-term plans, etc., but it remains practically the same. The current rental IBM is getting on the few IBM-owned 360s still around is based on IBM's 1965 price structure, not 1975 reality.

(Incidentally, what did happen to the other thousands of IBM-owned systems? Has IBM scrapped them, despite its contention that they are still worth the same as in 1965?)

The new policy did, of course, kill the earlier leasing techniques, but at the same time it brought the leasing companies into the business of buying new instead of old machines. And so the question arose of how to keep the machines supplied with software and how to attract users to them after the early period of manufacturing had passed.

After all, as IBM had pointed out, the systems are as good as new, and will certainly be useful for years to come.

But the software needs change as the users change.

Well, now the answer to the problem

posed by the one-sided nature of software provision by hardware manufacturers appears to have been given. If a system is good enough to become a best-seller — as the System/30 and System/3 have become and as IBM hopes the System/32 will become in the future — then the owners of the systems, if they are organized, will provide at least the minimum necessary software on some basis that doesn't make the individual buyer have to pay the whole tab.

The software may be delayed — The CLA conversion package has arrived just 10 years after the first 360/30 conversion capabilities (from the 1401) were so dramatically demonstrated one snowy January day in 1965. But it can be counted on by users who are planning ahead and making those rent-vs.-buy decisions.

So welcome CLA to the mainstream of software providers, both for providing the

service and for showing us that, when the need is of large enough magnitude, such as the need to support the many thousands of 360s that are in productive use, the necessary software will become available.

Important as this is for the present, it is even more important as a harbinger for the future of purchased System/3s and System/32s.

We can expect that these systems also will not lack new software when IBM decides to phase out its supply, but that non-IBM system software will become available when necessary.

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Two-Tier Price Structure Needed for CLA DOS Service

Taylor Report readers split on the surface about what the charges should be for the use of the independent IBM System 360 DOS support now being provided by the Computer Lessors Association (CLA) [CW, Dec. 25-Jan. 1].

The CLA had decided to open the service to 360 owners as well as to users who lease from CLA members, but the question of what charges would be reasonable for the service has not been settled. In particular, the trade-off between a low cost per call with a high annual subscription rate and a low annual subscription rate with a high cost per call was something CLA wanted opinions on before making a final decision.

In favor of the low cost per call with high subscription rates (\$20 per call after some free calls, but \$1,200 annually) were a Dr. Stern of Port Washington, N.Y., who argued that this would minimize the commitment of an organization, and T.V. Rowan of Philadelphia, who pointed out that his organization needs to make many more calls than other groups.

Supporting low annual subscriptions, Gerald Hirshman of Lansing, Mich.

wrote that his firm does not have a need for many calls, as did W.H. Phillips, of Queens, N.Y. and others. While these readers saw the service value as insurance, they also saw that high temporary use of the service would be a normal need to which the CLA should cater.

John A. Stewart of World Vision in Monrovia, Calif. detailed this approach best. He urged an upper limit to call charges for periods while something new is being implemented. His suggested limit was \$200 per week — which may be unattractively high, but the idea had support from others.

The apparent result is that a two-tier service is needed, one which provides an "insurance policy" for low-level users who would have negligible use of the service, and another which would provide for periods of more intensive help during installations, implementations of expansions, training of new staff, etc.

None of the CLA's suggested plans really reflects these two needs but, hopefully, the one that CLA soon announces will do so, thanks to readers' responses.

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Software: Packaged Performance

**A special report on the newest developments
in software packages in the February 26th issue
of Computerworld.**

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Letters to the Editor

Clearing Up Obscurities Shows Lost Benefits

A compositor's goof, displacing four lines from the middle of the third column of my commentary on the IBM antitrust situation [CW, Dec. 18] obscured two points I was trying to make.

An argument against the sweeping remedy of breaking up IBM into competing units was that we might lose certain benefits which IBM's management style has brought us.

The sentence supporting that argument should have read: "Historically, that style has brought benefits as well as problems when exercised from the position of single-firm dominance and has failed, notably in the case of RCA, when employed in a situation of contention among equals."

One of the measures I recommended in the event the Justice Department proves its case against IBM called for "subjecting IBM to special procedures for conformity to industry standards" and for disclosure and cooperation in matters relating to standards as long as IBM remains a dominant factor in an otherwise competitive industry.

Sander Rubin

Redondo Beach, Calif.

Supl Based on New Concept

I would like to clarify two points regarding the article "Hard-Wired Assembler on the Way?" [CW, Nov. 13]:

First, the inventor of both UAL and Supl was Dr. C. Muses, who collected with the late Norbert Wiener and Warren McCulloch of MIT and who now serves on the editorial boards of the journals *Kybernetes* and *Bio-Medical Computing* (England).

Secondly, the basis of Supl was not the same as for other systems; exactly the opposite is true. The basis of Supl is completely new and represents a new attack on the recalcitrant problem of natural language translation by computer.

C. de Montet

Publications Administrator

Research Centre for Mathematics
and Morphology
Santa Barbara, Calif.

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Letters to the Editor

Uncommitted VM Users

See Different Side of IBM

In the lead article, entitled "Where Is IBM's VM/370 Help? Share Group Asks" [CW, Dec. 4], CW reported the VM/370 project of Share, the IBM user group, has charged that "IBM is not supporting its product [VM] in any manner."

This might be true when viewed by committed VM users, as represented by the Share project, but it certainly is not the case when IBM promotes its product at uncommitted sites considering alternatives to VM.

My organization markets a software product (Roscoe) which provides many of the same conversational program preparation and maintenance services as VM/CMS. We've seen instances where IBM has provided many months of expert on-site VM support without charge, apparently to ensure that the customer's interest in VM does not waiver in favor of our product.

This does not particularly bother us because it emphasizes the fact that VM has an enormous operational, environmental and educational impact on any computer site that chooses to install it.

This impact is justifiable only when the installation has a specific requirement for multioperating system simulation or in-house engineering/scientific time-sharing. Without such requirements, VM with its CMS component is an exotic and costly way to provide Cobol programmers with an on-line programming capability.

R.M. Caughey
Product Manager

Applied Data Research, Inc.
Princeton, N.J.

Facts on UPC Out-of-Date; Scanning Becoming Common

I must assume that Bob Moneymaker had his commentary on the Universal Product Code (UPC) [CW, Dec. 4] in his desk for at least a year before submitting it. Otherwise, I cannot explain the absurd question, "has anyone asked the UPC proponents who has a scanner that will read the symbol they picked?"

In fact, as the previous week's edition pointed out, full store scanning systems are quickly becoming commonplace and are now operating in Ohio, New Jersey (two installations), California, Missouri (two installations), Texas, New York, Massachusetts and Montreal, Canada.

I estimate between four million and eight million items have now been scanned by these installations.

Unfortunately, this was not the only irresponsible comment in the article. Others included the assertion that supermarket chains are operating "so profitably." The amount of contrary evidence is so staggering that I wonder if there is some new definition about which the financial community has not heard.

A third area of the article which reflected Moneymaker's lack of knowledge of the UPC concept was his discussion of the number of digits needed. Obviously, unique, source-marked symbols are the point of the identifying digits, not whether 10 digits are needed for internal item control.

A fourth point dealt with price elimination on items. Again, he was obviously unaware that hundreds of thousands of customers have been served by a large Chicago-based chain which eliminated prices on large volumes of grocery merchandise in certain of their stores as much as a year ago and without scanning.

This is not to say that the impact of price removal has yet been assessed, but only that the industry has some meaningful experiences with the concept.

According to figures in the most recent *UPC Newsletter*, published by Distribu-

tion Codes, Inc., I estimate that about 50 billion to 70 billion grocery packages will be source symbol marked in 1975. Therefore, we should not be talking about alternatives to the UPC, but rather how food retailing systems professionals can optimize the value of its use.

David M. Carlson
Vice-President
Information Systems

Chatham Super Markets, Inc.
Warren, Mich.

Taking Off Price Marking No Way to Humanize a Store

In response to Robert W. Cort's defense of the Universal Product Code (UPC) [CW, Jan. 8], I say "Beans!" The UPC is a boondoggle for two reasons, one human and one technical.

The human reason is this: In a time of increasing concern about making com-

puter systems more human, the UPC removes price information from the store items. Comparison shopping by the consumer is made extremely difficult.

This is no way to humanize a supermarket.

The technical reason also has human overtones: the bar code can't be read by humans. I have been a computer programmer and analyst for nine years, am qualified for membership in Mensa and still can't figure how the bar code corresponds to the arabic numbers printed with it.

It's no solution to teach me the trick of reading the code; the solution is to make the code more easily readable by anyone.

It may be said that such objections arise from an unfounded paranoia about the intent of what is currently a relatively price-competitive industry. On the contrary, such objections are founded on sad experience as a consumer.

John Trotter

Los Angeles, Calif.

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Strategy Can Thwart 'Management by Protection'

By Elliot Raphaelson
Special to Computerworld

Over the last few years a number of new acronyms have been invented which supposedly advance the state of the art in management. I would like to discuss a technique that exists in most large companies and which, for lack of a better name, I will call "management by protection."

Simply stated, this is the technique by which managers schedule projects within a time frame and with a commitment of resources far in excess of what is necessary.

This is a popular technique in any work environment in which managers are measured primarily according to whether their schedules are met. If a manager knows that his performance review is based largely on meeting schedules, he will undoubtedly do whatever he can do to pad his schedules and request excessive manpower to insure that he makes his "hard-pressed" schedule.

If management either knowingly or passively has created this ineffective environment, there is no law that says the incentive structure that created it can't be challenged by a manager.

One way to accomplish this would be to try to set up an incentive structure with management that rewards productivity more than adherence to schedules which may not be productivity-oriented. And one way to demonstrate the point would be for a manager to submit a project schedule with the normal amount of fat.

After this schedule has been approved, the manager should introduce a revised schedule to management and point out that, while the latter schedule has more risk associated with it, if it is met the project group's productivity will be that much higher.

The manager can also point out that he wants to work informally toward making the tighter schedule, but if he doesn't come close to making it he will forever hold his peace and not question management's incentive structure.

ment's incentive structure.

The potential flaw with this approach is management's probable retort: "If you could get it done in less time, why did you schedule it with so much fat?" The

Reader Commentary

manager's response should be: "I'll remove the fat when you remove the penalty for missing a schedule."

Facing the Facts

Let's face facts: If a manager thinks something will take three months, then schedules it formally for six months, it becomes very difficult to pressure his subordinates to complete the job in three months.

And the end result is obvious. The job

gets stretched out to six months and the good people who are assigned to the job are dissatisfied because they know they can be more productive. In this type of environment, the best personnel leave and those with the least amount of ambition and capabilities stay.

No company can remain competitive for long with this type of philosophy. It will end only when a manager is just as afraid of "being on the carpet" because he can't back up an estimate as he is for slipping a schedule.

Insuring Realistic Estimates

But a manager can certainly insure that his subordinates' estimates are realistic. Consider the following four situations with the same project:

- Manager A tells his project manager to develop a schedule for a project but to make sure that he schedules it in such a way that he will not miss his deadline. If the project manager misses his deadline, he will automatically not be considered for promotion.

- Manager B tells his project manager that he wants a realistic schedule accompanied by a finer breakdown of activities. Furthermore, he tells the project manager to be prepared to defend his time estimates.

He also points out to the project manager that one of the most important tasks he will be measured on is his ability to define those activities and to develop justifiable time and resource estimates for them.

- Manager C tells his project manager to give him a target date with no further instructions. After the project manager has prepared his target date, Manager C doubles the estimate.

- Manager D tells his project manager to give him a target date with no further instructions. After the project manager has prepared his target date, Manager D halves the estimate.

I'm sure you are all familiar with Managers A, C and D. Manager B is pretty rare — and it is understandable, given the environment in most organizations.

Let us go back and look at the impact each of the managers will have on their project managers.

The impact Manager A will have is obvious; it is clear that the only thing he is interested in is not missing a schedule. If a job should take three months, the project manager may estimate it at six months and will bring the job in on schedule — in six months.

Manager B's approach will force the project manager to do his homework. The project manager will develop a very detailed plan and, as a result, may even come up with some useful planning shortcuts. He will probably schedule the job in three months or less and bring the job in on schedule.

Manager C is similar to Manager A. The main difference is Manager C doesn't trust his project manager to pad the estimate.

Manager D is a "results-oriented" manager. He lets his management know that he is cutting schedules in half because he knows his people schedule with too much fat.

Obviously, anyone who works for Manager D will hate him. After the first project, estimates will be more than doubled since the project manager knows what will happen to his estimate.

In summary, management will become more effective only when it can avoid the trap of being concerned with meeting schedules and become more concerned with developing reasonable schedules.

And when managers convince their subordinates that putting fat into schedules will hurt their performance review as much or more than missing a deadline, then the organization will become more effective immediately.

Raphaelson, a strategic planner, is a second vice-president of Chase Manhattan Bank.

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Random Notes

\$25 Multiple Plot Routine Uses Univac Line Printer

ATHENS, Ga. — As many as 10 curves can be plotted on a single graph using a line printer linked to a Univac 1108 as the plotting instrument with a \$25 package from the Cosmic clearinghouse at the University of Georgia.

To plot more than one curve, however, all must have the same number of points and the same independent variable array, Cosmic noted.

The Plotit program, including documentation, is cataloged by Cosmic as MFS-22596 and is available from 112 Barrow Hall, 30601.

Fortran Compilers Added To Lockheed SUE . . .

LOS ANGELES — An ANS Fortran compiler is now available as an option on the System-User Engineered (SUE) minicomputer from Lockheed.

The language package executes in 8K words, supports all the SUE peripherals and operates under the Operator Utility Interface Package, Lockheed said.

SUE's Fortran, which sells for \$1,000, also includes logic allowing exits to assembler subroutines to facilitate special programming requirements, a spokesman for the Data Products Division said from 6201 E. Randolph St., 90040.

. . . And to CAI's Naked Mini

IRVINE, Calif. — An optimizing Fortran IV compiler that runs under DOS or Real Time Executive (RTX) on Naked Mini minicomputers, is now available from Computer Automation, Inc. (CAI).

In DOS mode with 16K memory, the compiler features "understandable" diagnostics and a readable object listing to aid in debugging, the company noted.

The package allows users with limited I/O needs to work with peripherals without the FORMAT statement. Internal buffer-to-buffer reformatting and data conversion and end-of-file and error processing for I/O are also part of the software, CAI said from 18651 Von Karman, 92664.

CBLshort Enhanced

LYONS, Ill. — Improved operating speed, an interface to many commercially available source library maintenance systems and a paragraph-numbering routine to avoid duplicate labels are among the features of Release 2 of the CBLshort precompiler from General Electronics.

Written in ANS Cobol, the package can be run on any CPU with standard Cobol capability. Source code for CBLshort is available for \$300 from the company at P.O. Box 79, 60534.

Two Monthlies Agree:

CPE Standards Needed by Management

By Don Leavitt
Of the CW Staff

A growing number of installations are becoming concerned about computer performance evaluation (CPE) but finding themselves frustrated in talking effectively to other installations about it. Two recent publications recognized that and tried to help the cause.

The words used by *EDP Performance Review* (EDP/PR) were almost the same as those used in the *Value Computing, Inc. Newsletter*. One noted "the lack of standards in the field of performance evaluation hinders communication" while the other keyed on "the communications problem that is generated by a lack of standards."

Value noted that upper management would be either unimpressed or confused by reports on the percent of time the CPU, I/O channels or both were busy in any given measurement period. To get around this confusion, DP people some-

times slip into casual definitions of "good" or "bad" performance, the monthly said.

Instead of that, the newsletter suggested a set of working definitions of terms that must be considered in evaluating performance, but it urged readers to write if they felt the proposed dictionary was faulty.

One basic problem, unstated but perhaps significant, lies in the fact that the definitions in *Value's* listings applied to IBM systems, but not Burroughs, for example.

Broader View

EDP/PR took a broader view of measurement and evaluation. Editor Phil Howard admitted there are certain metrics and techniques in "fairly common usage," but he added there is no agreement on what should be measured or what constitutes "good" performance.

His report explored the general subject of standards, why they are needed and

what some of the obstacles are.

A possible approach to the development of some standard measures of performance was suggested: A standard measure, whatever it may be, would allow two users to compare numbers so the difference, or variance, would have precisely the same meaning to both, Howard explained.

"If we could devise a standard unit of work, one that applies to any computer system, then the ratio of work to total system cost would provide a true cost/performance index," he added.

Perhaps the word "standard" is too narrow for present conditions, he said. Instead "let's consider standards as a voluntary and widely applicable set of criteria for measuring performance."

These would fall into two categories: metrics for performance measurement and standard measures of "good" performance, Howard suggested.

"Quasi-standards" have been established in the first category, including the way measurements are presented, he said, citing the histogram system profiles generated by hardware monitors as the primary example of this halfway point in measurement and evaluation.

Circular Kiviat graphs "have more visual appeal because different classes of system utilization produce distinctively different shapes," he said, but "unfortunately the graphs are not yet widely used as a measurement tool, which limits (for the time being) their use as a standard."

EDP/PR is published monthly by Applied Computer Research, 8808 N. Central Ave., Phoenix, Ariz. 85020, for an annual subscription of \$36. *Value Computing's* newsletter can be acquired from the company at 300 VCI Building, West Marlton Pike, Cherry Hill, N.J. 08034.

'IQ' Builds Load-and-Go Code For 'Any' System With ANS Cobol

WALTHAM, Mass. — Nonprogramming managers and clerical help have one more inquiry and retrieval system to aid them in working with available data, with the Information Quick (IQ) package from The Management Group, Inc. (TMG).

The package is a load-and-go system that takes user requests and converts them into ANS Cobol source code, which is then compiled and run. For users who want to work with the Cobol code, the process can be halted at that intermediate stage, the vendor admitted.

IQ searches double or single files, performs logical and arithmetic operations and prints output reports in standard or user-specified formats, all under the non-procedural control of RPG-like entries on a specially designed coding sheet, the vendor said.

Checks Performed

Editing and verification checks are performed on all IQ requests. The package supports detailed, summary or matrix presentations of data with stored column headings and automatic column spacing.

IQ operates from a data elements dictionary which defines the user's data base. Existing files are not disturbed or altered, the vendor stressed. The disk-based dictionary identifies data by name, location, synonym or code.

Selection and manipulation of data is triggered by link operators which are logical (Equal, Greater Than . . . including AND and OR) or arithmetic. They may be used in conjunction with "action state-

ments" (Call, If, Move, Perform, etc.) for requesting extensive comparisons, computations and manipulation routines, TMG said.

IQ runs on any mainframe that supports an ANS Cobol compiler, has disk storage facilities and a minimum 96K of main memory. The package sells for \$15,000; at least one short-term rental plan is available.

TMG is at 393 Totten Pond Road, 02154.

Monitor Gets VS 'Supercharger'

NEW YORK — The Intercomm teleprocessing monitor system from Programming Methods has been modified for IBM VS operations. The enhancements, under the modest name Supercharger, are in Release 6.2 of Intercomm and have provided users with a "dramatic improvement in CPU time usage," according to the vendor.

The drop in CPU consumption was "like getting another 370/158," one user said, while another was quoted as saying Supercharger enabled him to immediately start another initiator on his 158.

A third user reportedly cut CPU utilization from a consistent 49% to a more manageable 22%.

The performance improvements were made after tests showed many system services under VS are considerably more costly than their OS counterparts, a spokesman said. Supercharger in no way

modifies any part of VS, but substitutes alternative methods for what Programming Methods considered wasteful VS operations, he explained.

Earlier Intercomm releases have worked quite successfully in VS as well as OS environments but, in the VS mode at least, focused on solving response time and throughput problems, the spokesman added.

But each "solution" seemed to cause "significant increases" in CPU time. Supercharger is a rewrite designed to reverse that pattern, he said.

Intercomm operates on systems with 256K or more main memory. The VS modifications add "only a couple of hundred" bytes to the basic system, Intercomm, Release 6.2, is available now at \$1,000/mo for 48 months.

Programming Methods is at 1301 Avenue of the Americas, 10019.



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SBC Services Linked

GREENWICH, Conn. — Users have the opportunity to transfer data between interactive time-sharing and remote batch-processing environments with the Call-Transfer capability recently introduced on the Service Bureau Co. (SBC) remote-computing network.

With the new facility, users have a link between Call/Plus, an OS/Hasp/TSO remote batch system; Call/370, SBC's time-sharing system; and their own in-house computing capabilities.

The Call-Transfer service uses a dedicated communications line to connect the Call/Plus IBM 370/155 in Paramus, N.J. with the Call/370 systems in Cleveland, an SBC source explained.

The service enables users to utilize the equipment best suited for each particular processing task. A user will be able to take a summary file, for example, on in-house equipment, convert it into an OS master file and transfer it to Call/370 to use one of

SBC's application programs.

Alternatively, data could be collected from many locations via the SBC network, then processed by the system's data management system software with the results transferred to Call/Plus to update a large file.

Call/Plus, an enhanced version of a capability once offered by ITT Data Services.

Call/370 supports program development in Basic, Fortran and PL/I. The Call/Plus service backs work in Assembler, Basic, Cobol, Fortran and PL/I, the spokesman said, adding that with both TSO and remote batch capabilities, Call/Plus permits interactive development of programs which can then be moved to batch mode for processing.

SBC has regional sales offices supporting its remote-computing capabilities throughout the country. The company is headquartered at 500 W. Putnam Ave., 06830.

Full Page Devoted to Each Verb In 'Ruggedized' Cobol Handbook

ELKIN GROVE, Ill. — While various Cobol reference books have appeared over the years, the *ANS Cobol Syntactical Handbook*, now available from Advanced Systems, Inc. (ASI), is said to be superior to earlier efforts in both its content and its physical makeup.

The 166-page, loose-leaf book follows Cobol through its component divisions — Identification, Environment, Data and Procedure. Entries in the first three divisions are usually made in groups, ASI noted.

The major part of the syntactical definition, however, is an alphabetical listing of the procedure division verbs. Each verb, including a general syntactical definition of the statement in which the verb is used, is presented on a separate page. These are followed by examples illustrating how each of the options and combinations of options might appear in

a program.

On the bottom of each page is an area with comments keyed to the syntactical definitions.

A loose-leaf format is useful for updating but can often lead to torn, missing or badly soiled pages. To avoid this, the pages of the new handbook are thin, plastic sheets which resist the strains of heavy use, ASI said.

The handbook is distributed as part of student materials with ASI's *ANS Cobol* courses. It is sold separately, however, for \$18.50.

FDIC Bank Data

Now on T/S Net

WALTHAM, Mass. — Access to detailed financial information on more than 13,500 federally insured commercial banks is now available from a Federal Deposit Insurance Corp. (FDIC) data base on the Interactive Data Corp. (IDC) remote-computing/network.

The on-line service provides an analytical tool offering a variety of applications to banks and any business organizations requiring data about banks, IDC said.

Users can obtain a screen display or hard copy of more than 200 data items filed with the Federal Reserve Board on each bank.

These include annual balance sheet items from the face of the bank's "Report of Condition," beginning in 1969; annual balance sheet items from the back of the "Report of Condition," beginning in 1972; and annual income items, beginning in 1972, from the "Report of Income."

The data base also contains the most recent midyear balance sheet items from both sides of the "Report of Condition."

In addition to balance sheet items, the "Report of Condition" gives supportive information such as a breakdown of loans, cash balances with other banks and demand and time deposits.

Beyond accessing these reports in their original form, users can employ network facilities to generate any type of financial or statistical analysis of these data, an IDC source said.

IDC is at 486 Totten Pond Road, 02154.

Varian Blitzes DEC

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A=B	4	14
Do Loop	4	22
A(I,J)=B	22	63
A=Sin(B)	100	251

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For your copy of the complete report, call your nearest Varian Data Machines' office. Offices in major U.S. and European cities. Or write Varian Data Machines, 2722 Michelson Drive, Irvine, CA 92664, (714) 833-2400.



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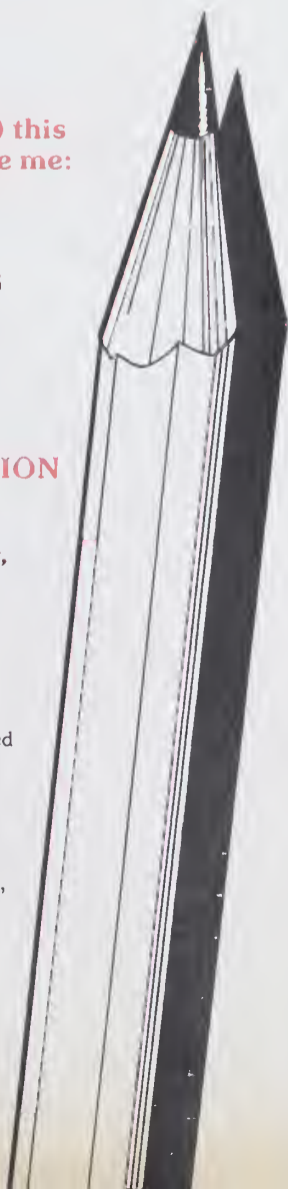
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Course #1010—

Practical Data Communications Systems and Concepts

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Chicago—Jun. 2-3
Orlando—Jul. 2-3

New York—Feb. 10-11
Washington, D. C.—Jun. 9-10

Course #1020—

Advanced Teleprocessing Systems Analysis and Design

This course is a follow-up to Course #1010, with special emphasis on problem solving techniques for minimizing operating costs in commercial data communications networks. Also led by Dr. Dixon Doll, the course covers procedures, approaches and algorithms for evaluating and cost-optimizing network organizations.

This seminar runs three days, and total cost, including an extensive set of customized course materials, luncheons and continental breakfasts is \$450. Additional registrants from the same company qualify for a reduced rate of \$400. Current schedule is as follows:

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- Optimum File Organization and Indexing Techniques
- File Integration
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You should attend this seminar if you are (or will be) involved in the design and/or implementation of a data base system and whether as a Data Base Designer, Planner or Analyst.

This course runs for 3 days and costs \$350, including course materials, continental breakfasts and luncheons. Additional registrants from the same company qualify for a reduced rate of \$300. Current schedule:

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Our course leader is Saul Stimler. His book, *Data Processing Systems: their performance, evaluation, measurement, and improvement*, will be an important part of the seminar. As well as case studies, topics that will be covered include:

- Criteria for quantifying performance
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 - Benchmarking techniques
 - Realtime, batch, and interactive time sharing systems
- You should attend this seminar if you are a data processing professional or corporate executive whose responsibility it is to plan, benchmark, evaluate, or improve data processing systems.

Cost for the entire seminar, including continental breakfasts, luncheons, and all course materials (including a copy of Saul Stimler's book on the subject) is only \$250.

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- Key-disk hardware and software
- Evaluating... and starting... key-disk systems
- Selecting and operating intelligent terminals, both key-to-cassette and key-to-floppy disk
- Key-disk as a remote batch terminal
- Supervisor functions; motivation
- Mixed Media systems
- Trends in Computer Data Entry

This seminar is lead by Lawrence Feidelman, President of Management Information Corporation, and one of America's leading experts on data entry. All participants will receive a copy of "Data Entry Today", Management Information Corporation's authoritative publication on every aspect of data entry, including a six-month update of this continuing reference service.

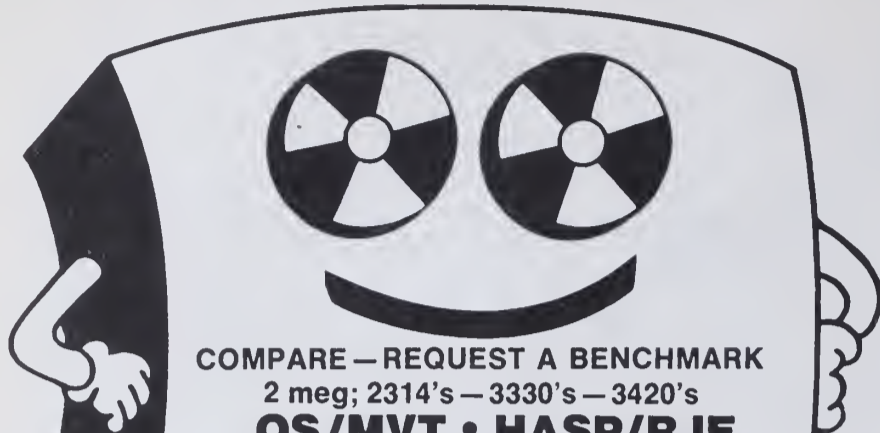
You should attend this seminar if you are concerned with optimization of your data entry shop, and especially if you are considering or currently using key-to-storage systems more advanced than basic keypunch. Cost for the 3-day seminar is \$350, including continental breakfasts, luncheons, and all course materials. Additional registrants from the same company are charged only \$300.

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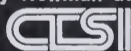
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'Tfast' Puts AVR Usage In Tape-Based DOS Shop

FORT LEE, N.J. — Most IBM DOS and DOS/VS users can reduce or at least control the number of tape drives needed to get optimal use of their resources with the on-line tape management system, Tfast, from Oxford Software Corp.

Key to the new utility's effectiveness, the vendor explained, is an automatic volume recognition (AVR) capability. Normally, DOS and DOS/VS users have to define the drives on which files are to be mounted with Job Control Language (JCL) entries.

A change in drive assignment would require a new JCL entry. With AVR, however, tapes can be mounted on any available drive without any change in JCL. The software will locate the necessary files and adjust internal coding to work with the correct drive.

In effect, Tfast allows DOS partitions to share tape facilities, rather than claiming exclusive rights to individual drives. In

conventional situations, users have had as many as six or eight drives installed but only two or three of them actually in use, the vendor claimed.

Tfast should allow five drives to support the same workload, with all drives being used more consistently.

As high-speed drives cost "somewhere around \$6,000/yr," Oxford said, any reduction in the number of drives needed represents a considerable savings.

Alternately, more jobs could be run with no change in the number of drives, a spokesman suggested.

Tfast operates in the transient area of the DOS or DOS/VS supervisor and does not impact space available for applications. Said to be easier to install than other tape management systems, Tfast sells for \$6,250, rents for \$250/mo, or leases for a minimum of a year for \$225/mo.

Oxford is at 511 Main St., 07024.

'AR/80' Expands Cash Handling

EAST HARTFORD, Conn. — Expanded cash application capabilities, "significant" improvements in reporting power and system flexibility in batch or on-line mode are available to IBM 360/370 users with the AR/80 accounts receivable and credit management package from Computer Systems and Education Corp. (CSEC).

An enhanced version of AR/70 (which CSEC said it will continue to sell and support), AR/80 permits the use of variable terms, revolving charges, repeating transactions and dynamic credit limits.

Unearned discounts, unauthorized deductions, past-due accounts and other problem areas are also managed by the CSEC packages, the vendor said.

The full on-line cash application capability is said to provide four separate methods of cash removal with a turnaround document. Customer accounts can be accessed through an alpha key, customer number or invoice number arguments.

Outputs from the system include normal accounting reports, credit status exception listings, unauthorized deduction notices and various management summaries, CSEC said, adding that since Cobol source code is provided and the system has a modular structure, users can modify elements of it with "relative ease."

The package runs under OS or DOS, VS or VM and, for on-line operations, can be configured to run under IBM's Customer Information Control System (CICS) or Turnkey Systems' Task/Master telecommunications monitor.

It can be interfaced with data base files, CSEC said, explaining that the application programs themselves execute independent of file definitions.

AR/80 operates in 90K (DOS) or 128K (OS) on a 360 or 370 and can be acquired for \$30,000 plus the cost of any customizing done by the company, which is at 111 Ash St., 06108.

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In Datapro Survey of 276 Users

Non-Bell Modems Equal Bell Performance, Reliability

By Edith Holmes
Of the CW Staff

DELRAN, N.J. — A recent survey has found users rate Bell and non-Bell modems about equal in overall performance and reliability.

But modem maintenance service provided by Bell continues to draw higher average user ratings than do comparable services offered by the non-Bell modem vendors, the survey, conducted by Datapro Research Corp., indicated.

At the same time, the survey found modems produced by independents received higher user ratings for their diagnostic facilities.

Included in the January supplement to *Datapro 70*, the survey formed part of a 42-page report which outlined the characteristics of more than 280 modems now in use and available from 50 manufacturers.

Datapro's modem survey attracted responses from 276 users with a total of 8,738 installed modems, including 4,502 supplied by the Bell System and 4,236 supplied by more than 20 independent vendors. Users rated the devices on a scale ranging from 1 for poor to 4 for excellent, and Datapro constructed weighted averages of the results.

Both Bell System and independent modems received overall performance ratings of 3.5, and hardware reliability ratings for the two groups were 3.5 and 3.4 respectively.

The report noted that in the area of maintenance service Bell earned a 3.2 while the independent vendors trailed with 2.9.

A 2.8 in the category of diagnostic facilities, however, put the independents a few steps ahead of the Bell System's rating of 2.3, according to the survey.

Datapro took publication of the diagnostic ratings as an opportunity to comment on user attitudes toward such testing facilities.

"We feel that the capability to check out the components of a communication network to determine just where the trouble lies is an important one," the research firm said. "Many users do not agree."

"Their attitude may be that they are paying the vendors (mainframe, common carrier, terminal and modem) for equipment and service, and that they can jolly well fix the things when they go wrong."

While noting that such a position is difficult to argue with since the customer is willing to pay for such service, Datapro commented, "Unless the customer is also willing to put up with the delays involved in such an arrangement, he should consider ways to quicken the trouble-shooting process."

Wide Variations

The study detailed the specific user ratings assigned to more than 50 individual makes and models of modems and showed wide variations in the ratings earned by the various independent modem manufacturers.

Survey questions on what kinds of modems respondents employ elicited the following distribution of modem operating speeds: up to 300 bit/sec, 20.2%; 600- to 1,800 bit/sec, 16.5%; 2,000- or 2,400

bit/sec, 29.3%; 3,600 bit/sec, 2.5%; 4,800 bit/sec, 20.8%; 7,200 bit/sec, 4.5%; 9,600 bit/sec, 8.6%; and over 9,600 bit/sec, 2.2%.

A further breakdown of higher speed modems indicated that "without question, the results show that 4,800 bit/sec transmission is practical over both the telephone network and unconditioned leased voice-grade lines."

The survey also indicated users place different emphasis on various modem features. According to the report, the percentages of responding users employing several common features were: full du-

plex, 41.9%; auto answer, 31.0%; diagnostics, 29.0%; alternate voice/data, 27.4%; reverse channel, 17.6%; multiple speeds, 14.3%; manual equalization, 10.3%; and multiple channels, 6.0%.

Noting that at present there are over one million installed modems, Datapro predicted that the current 32% of users with devices from independent vendors will grow to 50% by 1980.

Entitled "All About Modems," the report is available for \$10 from the research company at 1805 Underwood Blvd., 08075.

Varian Message-Switching Line Includes Four Turnkey Systems

IRVINE, Calif. — Four automatic store-and-forward message-switching systems have been introduced by Varian Data Machines.

The standard turnkey systems can be upgraded from a single processor configuration. Larger models include a redundant system with dual disk writing, a regional configuration with automatic backup and a maximum configuration with up to 512 communication lines plus expanded main and secondary memory capacities.

The systems are said to offer alternatives which common carriers cannot provide at competitive prices. Besides economics, benefits include privacy, need-to-

know security, fast delivery, no lost messages and an audit trail for each transmitted message, according to the company.

Four Configurations

The four basic configurations are:

- Minimum configurations have 32K-word memories with any V70 series processor, a magnetic tape drive, 2M-word disk storage, low-speed line printer and a data communications multiplexer with up to 32 low-speed lines for TWX, Telex or Teletype-compatible interfaces.

- Redundant configurations offer maximum data recovery capabilities. They have dual processors, dual disks with individual controllers, dual tape drives plus a complement of data communications equipment equal to or exceeding the minimum configuration.

- Regional configurations have either single processors or redundant system configurations. They are interconnected via one or more synchronous data links which provide network integration, load distribution and "the ultimate in network availability/capability," Varian said.

- Maximum configurations accommodate up to 512 communication lines with corresponding increases in main memory and disk subsystem capacities depending on line speeds, message lengths, terminal interfaces, etc.

An advantage of all four configurations is their utility "beyond that of a dedicated switching system," the vendor said. Because all four systems are based on Varian's Vortex/Vtam real-time operating system, other processing tasks, such as remote job entry, on-line inquiry and compilations can be done concurrently with message switching, it added.

Initial delivery is set for the first quarter. The standard turnkey systems begin at \$80,000 from the vendor at 2722 Michelson Drive, P.O. Box E, 92664.

DDS User Finds Fewer Errors, Less Costs

By Ronald A. Frank
Of the CW Staff

WALTHAM, Mass. — Interactive Data Corp. (IDC) has become one of the first users of AT&T's Dataphone Digital Service (DDS). And, after several weeks of use, DDS has been found to be more reliable at a lower cost for IDC.

As part of its time-sharing network between Boston and New York, the company maintains five voice grade lines. It has replaced one of these 3002-type lines with a DDS link, according to Frank Mahoney, vice-president of operations.

Both the conventional private lines and the new DDS line operate at 9,600 bit/sec. On the analog lines, IDC uses Codex modems while the DDS line has a Bell Data Service Unit (DSU).

The lines actually carry multiplexed data which combines interactive low-speed 30 char./sec transmissions from many users. The multiplexers are sup-

plied by General Datacomm Industries.

The DDS line has been operating for several weeks and so far seems to be less error-prone than the conventional 3002 lines with C-2 conditioning, Mahoney said.

The DDS line is being accessed on an open availability basis by IDC's New York customers, who use dial-up facilities. Most of the users are accessing the financial services available on IDC's IBM 370/158 mainframe in Waltham.

The DDS facilities are completely transparent to the user who might call into IDC on any of the five links between New York and Boston.

The DDS link has saved IDC about 34.9% compared with analog private lines under Tariff 260. The comparison was between 3002 lines with C-2 conditioning and local loops and DDS links with DSU and the required Data Access Line. The analog lines included data sets which are not needed with

DDS.

Both types of lines were monitored for errors on a continuing basis and the average number of hits per line was found to range between 56% and 67% less on DDS than the errors encountered on the analog lines.

Despite the obvious advantages, Mahoney said IDC still has some reservations about DDS. Since the digital service operates with master clocking, there is no possibility of introducing an externally clocked bit stream. This limits the service to point-to-point configurations, he said.

And, even with the lower rate, there have been some momentary bursts of errors which have caused dropped data bits. Mahoney said DDS appears to be most suited as a short distance solution to local loop problems.

If this opinion proves valid, then DDS will not be the best facility to use on longer distance links between cities, Mahoney said.

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Terminal Transactions In Magnavox Display Terminal Plasma Gas Panel Replaces CRT

FORT WAYNE, Ind. — The Magnavox Co. has introduced the Model 10,000 plasma display terminal, designed for the generation of alphanumeric and graphics. It can display both microfiche and CPU-generated data simultaneously.

The Model 10,000 replaces the standard CRT with an 8-in. square, 1/2-in.-thick glass panel with plasma gas sealed inside. The plasma gas is formed into a dot matrix of over 262,000 individual dots, and each dot may be electronically illuminated to create a display of alphanumeric and graphics.

Characters and lines are said to remain constant with no flicker

until the information is modified by the user or the computer. This eliminates the need for both the computer refreshing and local buffer memories required with a CRT, Magnavox said.

Model 10,000 is designed for use with either a mainframe or a minicomputer. Communications interfaces are available for local operation or long distance direct dial lines. Data rates are selectable to suit user requirements, and two or more remote terminals may communicate with each other through the CPU link-up.

The terminal includes a keyboard for operator input and

control. Optional equipment includes a touch panel attachment which frames the display and allows operator interaction with the terminal without use of the keyboard.

A second option of the Model 10,000 is a microfiche rear projection unit. The unit is self-contained within the terminal and allows microfiche images to be superimposed on the display area.

The images may be displayed alone or as a composite with the computer-generated alphanumeric and graphics. This cannot be accomplished with CRT displays, the company claimed.

Software to support the Model 10,000 on the Hewlett-Packard 2000F time-sharing system and the CDC Cyber 70 has been developed. In addition, the terminal has a hardware interface for any RS-232C ASCII device.

The price of the terminal ranges from \$9,000 to \$13,000 depending on options. The company is at 4624 Executive Blvd., 46804.

EAI Terminal MOS/LSI-Based

WEST LONG BRANCH, N.J. — Electronic Associates, Inc. (EAI) has announced an MOS/LSI-based terminal system, the Spacer-75.

The system is contained in an integrated package which includes an alphanumeric and graphic CRT, an ASCII or customized keyboard, and 8K- to 32K-word, 16-bit minicomputer and a floppy disk bulk storage unit.

Options include 64 A/D channels, low-cost data acquisition modules and a full line of standard peripherals.

Supporting software for Spacer-75, which uses a disk-based operating system, includes a Fortran IV compiler, symbolic Assembler, digital operations interpreter, real-time Basic, text editor and debug routines.

Price for the system starts at \$13,900, depending on configuration. Minimum quantity for current purchase is 25 units, the firm said from 185 Monmouth Parkway, 07764.

3270 Cabling Supplied By Independent Installer

WELLESLEY, Mass. — For users of IBM 3270 CRTs, the installation and connection of terminals in local mode can be a problem.

According to IBM specifications, the 3270 requires coaxial cabling which often is in short supply and may be beyond the installation capabilities of most in-house maintenance staffs.

New England Terminal Systems provides a service designed to help users install their local mode 3270s in minimum time. Because it is the responsibility of the customer to arrange for cabling, this often can create time

delays and conversion problems, according to a firm spokesman.

Typical services covered by the firm are an installation schedule, cable requirements, raceways, conduits, etc. And all work is performed to IBM specifications, the company noted.

The company will supply cabling materials, advise on installation problems and do the work depending on the location and requirements of the user. Prices start at about \$50/terminal installation depending on requirements, a spokesman said.

An IBM spokesman said that "we don't install this type of cabling." It is the customer's responsibility to "procure, install, and maintain" the required cables. IBM will supply the cables if the customer gives a reasonable lead time, but the company will not install the equipment.

The IBM spokesman said he did not know whether the cable called for in the installation specification was in short supply, but a check of several major suppliers indicated that there was a lead time for coaxial cable of the type specified for the 3270 terminal.

New England Terminal Systems said it has the required cable and accessories in stock. The company is at 554 Washington St., 02181.

Coupler Links Up Scientific Tools

CHICAGO — A coupler introduced by Datacap, Inc. provides the necessary interface between digital scientific instruments and a teletypewriter or an RS-232C-compatible terminal.

With this coupler, almost any digital instrument can be automatically cycled with the data recorded in a computer-compatible media, the firm said.

Priced at \$980, the basic coupler is available off-the-shelf from Datacap at 732 South Federal St., 60605.



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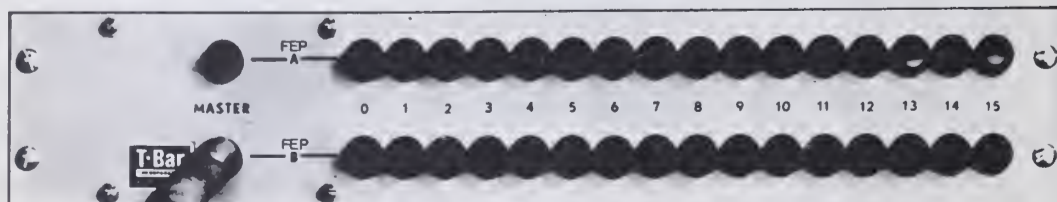
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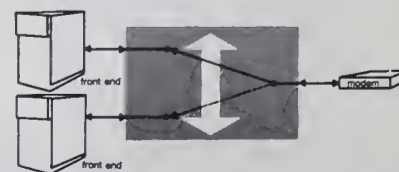
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DATA SYSTEMS DIVISION

Terminal Net Improves Retailer's Order Entry System

NEW YORK — With the recent installation of a new catalog order entry system, J.C. Penney Co., Inc. feels it is attuned to the needs of its customers and can improve service for them.

Following several months of study encompassing various options and vendor proposals, Penney selected the Digital Systems Division of Texas Instruments, Inc. (TI) to design and install a network of order entry terminals in catalog sales desks located in Penney retail stores in the eastern two-thirds of the U.S.

The system consists of stand-alone electronic message-switching (EMS II) systems at distribution centers and a network of terminals with cassette storage, as well as existing ASR Teletypes and Type 2 Data Speeds at catalog desks.

The EMS II systems automatically poll each terminal and collect catalog order data stored on magnetic tape cassettes. Order data, along with administrative messages, are transmitted at high speeds over communications lines to one of Penney's catalog distribution centers in Milwaukee, Atlanta, or Columbus (Ohio) for processing.

According to the company, TI is currently delivering the terminals as replacements for the ASR Teletypes and Data Speeds.

Systems Improvements

In the previous catalog order entry scheme, order clerks typed data from their handwritten catalog order forms off-line, punching a paper tape which was used later for transmission via mechanical teletypewriters to the distribution centers.

These teletypewriter terminals provided no source editing of data, simply transmitting whatever data the operator had keyed into the particular machine. Therefore, checking of data was relegated to the central computer.

This procedure led to an excessively large number of rejection orders caused by erroneous or incomplete data.

Also performed by mechanical teletypewriters, polling for the mechanical teletypewriter network required a large personnel force to place calls to various store locations at predetermined schedules, so data entries on the punched paper tapes could be transmitted to the distribution centers for processing.

To improve this in-store catalog order entry system, TI designed a terminal for the Penney's catalog customer order locations. Each terminal consists of a Silent 700 Model 733 automatic send/receive electronic data terminal with dual cassettes, combined with a TI Model 960 minicomputer containing 8K 16-bit words of memory and a built-in modem for 1,200 bit/sec data transmission over voice grade lines.

The minicomputer, expandable to 32K words of memory in the main chassis, enables the system to handle administrative messages as well as catalog order entries and provides the capacity to handle other data communications tasks in addition.

Now, although the basic operator input procedure is retained, data input at each catalog order entry station is source edited, thereby relieving the host computer of this task. Also, the retailer has found data entries are substantially easier to change with the magnetic tape cassettes system than with the paper tape system.

Data Transmission Upgraded

As before, once the catalog order entries are captured at the various outlets, they subsequently must be collected and transmitted at high speeds to the appropriate catalog distribution center. This portion of the network, too, has been upgraded with the EMS II systems.

The message-switching installations automatically poll each terminal for stored entries at the various catalog order entry desks around the country and then transmit the data at high speeds for order

processing.

In the catalog distribution center, the order data are entered into an IBM 370 order-processing system which produces

the order from being processed.

Such orders had to be removed from the order-processing stream and examined by a reprocess clerk who attempted to iden-

Terminal Transactions

tify and correct the data prior to reentry of the order. This generally resulted in a 24-hour delay and, in some instances, the complete omission of the order.

The edit features of the terminal have almost eliminated these types of errors, thus eliminating the vast majority of exception orders that must be reprocessed in the catalog distribution center.

Besides reducing a massive amount of paperwork, Penney said, the new system also minimizes communications costs by enhancing data throughput with a 1,200 bit/sec transmission rate as opposed to a previous rate of only 110 bit/sec for the

the order from being processed.

Such orders had to be removed from the order-processing stream and examined by a reprocess clerk who attempted to iden-

tify and correct the data prior to reentry of the order. This generally resulted in a 24-hour delay and, in some instances, the complete omission of the order.

mechanical system.

"The system provides several major advantages," said Ralph B. Henderson, vice-president and director of catalog operations.

"First, it identifies incomplete ordering information prior to transmission, at the point where the customer can be quickly and easily contacted. Second, it eliminates format and operator entry errors, a major source of problems."

Looking ahead, Penney is unable to predict all of the applications it may eventually load into its new system, but some of these tasks are already in various stages of implementation or development.

One such system about to be implemented is a time-sharing inquiry interaction package.

Correction

Data 100 Corp.'s Model 76 remote batch terminal [CW, Jan. 15] leases for \$620/mo on a one-year basis.

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Straight edges

Another hassle, even with premium tapes, is edge waviness. This causes intermittent reading and writing errors. Dynamic conditions during tape transport can occasionally compensate for the waviness, so it's a tough job to track down. Again, our double-cut slitting technique keeps 2000/A.D. edges absolutely straight and symmetrical.



Uniform width

Uniform tape width is essential, in order to avoid dynamic skew errors. According to industry standards, a width tolerance of $\pm .002"$ is acceptable. We peg our 2000/A.D. standard at $\pm .001"$. It's a small detail, but it could eliminate a few 3:00 a.m. debugging sessions.

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We've developed a new "hotter oxide" coating . . . a higher energy oxide that produces an output consistently higher than that of the National Bureau of Standards reference tape. Then we apply this oxide with a unique coating technique that provides a more even dispersion of oxide particles in the binder. For any bit density, including 6250 B.P.I., 2000/A.D. gives you more reliable writing and reading . . . better bit-to-bit uniformity . . . fewer drop-ins and drop-outs. And virtually no permanent errors.

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Bits & Pieces

'Superplotter' Combines Drum, Flatbed Features

SOUTH WINDSOR, Conn. — The stand-alone Model 42 Superplotter from Gerber Scientific Instrument Co. combines the plotting speed and space-saving advantages of a drum-type plotter with the accuracy of a flatbed plotter, the firm said.

The design and curvature of the Superplotter's drum, plus the design of the carriage, gives the Superplotter the accuracy of the flatbed device, a Gerber spokesman said.

The plotter is capable of 2.8 G acceleration and offers a plotting speed of 42 in./sec, the firm stated. It provides accuracy of $\pm .004$ in. and a repeatability of $\pm .002$. The drum's plotting area circumference is 36 in. by 48 in.

Fast paper loading of standard drawing sizes A through E is accomplished without clamps, tape or masking material, the firm said.

The plotter, with controller and magnetic tape input, costs about \$65,000 from the firm at 83 Gerber Road, 06087.

Multi-System Tape Becomes IBM Magnetic Tape Standard

PRINCETON, N.J. — IBM's Multi-System Tape has replaced the Series 500 to become the IBM standard magnetic tape for use on 1/2-in. drives.

The Multi-System Tape has been tested over the entire range of IBM tape drives, including the 2401, the 2420, the 3410 and 3420, and can be used for data encoding at all current densities — from 800 bit/in. to 6,250 bit/in., IBM said.

The tape reduces wear on tape drive read/write heads and "has superior thermal and moisture stability," the company added.

Cost of the tape is "comparable to Series 500 prices," IBM said.

3M Electronic Film Frame Counters Allow Retrieval of Microfilmed Data

ST. PAUL, Minn. — Electronic film frame counters are available for users of 3M Co.'s 400C and 500C microfilm reader/printers.

The counters indicate the number of frames that have "blipped" past the operator's viewing area and allow the operator to advance film at high speed until near a specified frame is approached. The user can then slow down the film transport and stop at the exact frame he wants, the company said.

The counters for the 400C and 500C reader/printers have a capacity of 10,000 or more frames.

The electronic counters, which can be ordered on new machines or attached to installed ones, cost \$800 from 3M at Box 33686, 55101.

By Wendell L. Smits
Special to Computerworld

MATTESON, Ill. — For years, two means of putting vast amounts of parts information on film have gone their separate ways. Today, these means have been successfully married after four years of use by Allis-Chalmers' industrial lift truck dealers around the world.

One of these systems is the straight source document reproduction on microfilm as a means of avoiding distribution of bulky price and parts material printed on paper. The second system, computer output microfilm (COM), skips the printed paper step.

Each system was developed with a separate magnification, 42X for COM and generally 24X for source document reproduction. Thus, each system had to be used independently.

In contrast, the blending of the systems required a uniform magnification so a single viewer could be used by the dealers. This simplification was intended to be, and has proved to be, a time, space and money saver for dealers. Today, the system is formalized under the name Quick Parts Identification (QPI).

Step-by-Step Process

The move to film techniques for moving parts information quickly and with an opportunity for space saving and instant retrieval was a step-by-step development.

As postal rates rose, a study of film vs. paper and of types of film began in 1969, leading to a decision favoring microfiche as a means of saving postage and paper costs. In addition, the study found microfiche insured updating of parts information by dealers and seemed capable of being flexible enough for possible changes in future state of the art. Costs were less and usefulness was assured by rapid, positive updating.

The basic system developed for use with lift truck parts called for reliance on source documents, which were extensively available and would continue to be so for factory use and customer use. Thus, the choice of source documents (24X magnification) was logical. Designation of the 42X magnification, however, was a more logical preparation for adaptation to future use of COM fiche.

Using COM fiche and source document fiche in the same system began quite soon, without fanfare and without added costs to dealers. No additional viewers or lenses were required.

The system idea was introduced to the dealers in April 1970. Ample time was given for questions and a "hands-on" demonstration and workshop. Several good questions indicated changes should be made to the system before mass delivery to the dealers.

These changes were made and the system (including the initial fiche, a fiche

stacker and a reader) was delivered to the dealers. The initial fiche included parts pages covering all current production at that time, with a promise that fiche covering out-of-production units would be covered at a later date.

In July 1971 the first master numerical index (MNI) was published on three fiche. These fiche (previous issues on hard copy) contained the entire list of service part numbers in the industrial truck system except for hardware. Brief word descriptions, stocking codes, supersessions, etc. were indicated behind each number.

A dealer can now tell at a glance the exact status of the part within the system. Hard-copy issues previous to this were really printed copies of computer printout and, since the system was entirely computerized, it was natural to make these the first COM-generated fiche.

They are now updated nine times a year, contrasted with previous hard-copy updates twice a year.

At the same time that MNI was published, a true source document/COM marriage took place. A fiche called "Standards MNI" was introduced that was literally one-half COM and one-half source document. This fiche covered all hardware numbers in the system.

The copies sent to the dealers contained images of the hardware pages from the engineering standards manual on the left side of the fiche and COM-generated listings of hardware numbers in MNI style on the right side.

A dealer could, with one fiche in the viewer, very easily read the drawings and descriptions on the fiche as well as the numbers on the right.

Allis-Chalmers supplies the source docu-

ments and a computer tape to a service bureau, Xerox Commercial Microsystems, and turnaround is generally one week.

But by mid-1972 it was apparent that the addition of one or two more COM fiche could help dealers locate descriptions for part numbers in stock. Many times a dealer or a customer has a part number on which additional information is needed. Therefore, a COM-generated fiche called a part number index was developed and published.

This fiche contains every active part number in the system, in numerical sequence, with a corresponding fiche number or numbers in the system where the part number can be located.

The Industrial Truck Division is the exclusive marketing agent in North America for a line of imported lift trucks and sideloaders. The manufacturer has his own part numbers, but to fit the completely computerized dealer ordering system, Allis-Chalmers numbers were assigned to each of the manufacturer's numbers and a computerized cross reference was set up.

Customer parts manuals carry the manufacturer part numbers (the same manual is used worldwide) and, when he wishes to order a part, the dealer converts to the Allis-Chalmers number before ordering from the central parts department.

In the four years since its introduction, the QPI system has shown all the earmarks of a good marriage. It has compatibility, it improves with time and the two elements become more dependent on each other with age.

Smits is supervisor of technical publications/graphics at the Allis-Chalmers' Industrial Truck Division.

MDS Releases Mid-Size Key/Disk

UTICA, N.Y. — In response to "increased demand for faster printing and higher communication rates at both central and remote sites," Mohawk Data Sciences (MDS) said, it is adding another system to its key-to-disk family.

The 2409-0 key-display system combines the communications/print capabilities of larger MDS 2400 configurations with the economy of smaller 1200 key-to-disk systems, the vendor said.

The 2409-0 is designed for medium-size shops with four to 16 keystations which desire intelligent data preparation concurrently with extensive printing and communications. Its open-ended design allows ample room for expansion without upgrading to a different system, MDS added.

Consisting of a 32K processor expandable to 64K, the 2409-0 has three I/O channels and a disk drive which holds 14,000 records. Packages such as the IBM 2780, 2968, or 360/20 emulators, print

utilities and media conversion operate in background mode without disturbing operator productivity, MDS said.

Configured with a communications controller, the 2409-0 can become a remote batch terminal. With card reader and printer attached, the user could use the system as a remote job entry terminal, MDS said.

The 2409-0 is said to be fully compatible with Mohawk's existing line of key-to-disk systems. For system expansion, the user can order two industry standard tape drives, a printer (100 char./sec to 1,250 line/min), a card reader and punch and a communications controller (1,200 bit/sec to 56 kbit/sec).

The 2409-0 sells for \$29,100 or \$734/mo on a three-year lease, plus \$46/mo per keystation. Tape drives, a communications controller and peripherals are priced separately from the 2409-0 control unit. MDS can be reached through Box 362, 13503.

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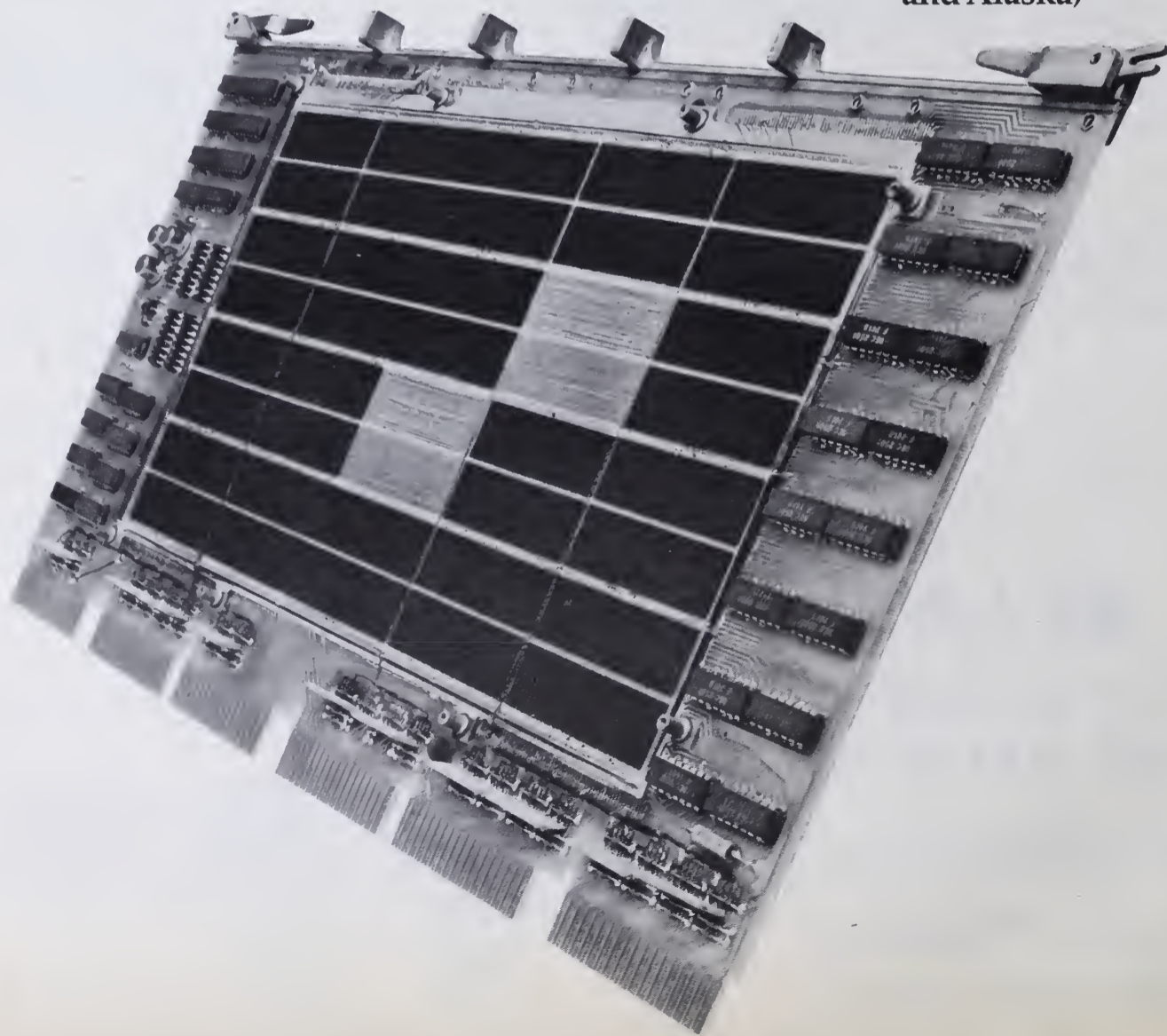
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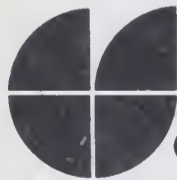
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Disk Drive Ups NCR 399 Storage

DAYTON, Ohio — Data storage and sorting capabilities of the NCR 399 accounting computer have been increased with the addition of a 656-cartridge disk drive.

Only magnetic ledger, punched paper tape, punched card and cassette data storage were previously available with the NCR 399.

The NCR 656 disk drive is a single-spindle, dual-cartridge unit with one fixed and one removable disk. Each disk has a storage capacity of 4.98M characters for a

total of 9.86M characters.

The unit has a transfer rate of 312K char./sec and an average access time of 47.5 msec. It rents for \$495/mo and has a purchase price of \$17,500 including the associated disk controller.

Disk packs are interchangeable between the 399 and Century 101 or 151.

Magnetic Cards Fit IBM MC/ST System

SUNNYVALE, Calif. — The MC-1000 magnetic cards from Information Terminals Corp. are compatible and interchangeable with IBM Magnetic Card Selectric Typewriter (MC/ST) cards, the firm said.

The cards may also be used on IBM, Xerox, Redactron and Sperry Remington word-processing systems, the company noted.

A box of 25 cards costs \$25.75 from the firm at 323 Soquel Way, 94086.

Handprint Recognition Added by Compuscan

TETERBORO, N.J. — A handprint recognition option is now available on Compuscan, Inc.'s Model 170 and will be available on the firm's Alpha line by the third quarter of 1975.

The handprint capability recognizes numerals from 0 to 9 and the letters C, Z, T, S and X. The firm said all handprinted characters must be written in proper configurations to assure recognition accuracy.

Small Rejection Rate

Under normal conditions, the firm claimed, not more than one character in 200 is rejected.

The handprint recognition option costs \$8,000 from the firm at 900 Huyler St., 07608.

Data Transportation Eased by 'Mobilizer'

HOLYOKE, Mass. — The Mobilizer Data Reference Table is lightweight, caster-mounted table that permits transportation of bulky printouts from one department to another, according to its vendor, National Blank Book Co., Inc.

The Mobilizer is available with or without a hanging storage rack to hold up to six data reference binders.

The 24-in. by 18-in. white work surface is at a standard 28-in. table height and has a stainless steel reference bar to keep bulky binders from flipping shut as well as to prop them up for easy reference.

The Mobilizer costs \$100 from the firm at 01040.

Plotter/Printer Costs \$6,500

CLEVELAND — Gould, Inc. has introduced a \$6,500 electrostatic printer/plotter which produces computer-generated alphanumeric and graphic material on 11-in. fanfold or roll paper.

The Model 5010, which operates at a resolution of 100 dot/in. vertically and horizontally, prints 132 char./line at a speed of 600 line/min and plots graphics at a speed of 1.2 in./sec.

At the design speed, the unit can produce graphics, such as charts, diagrams and drawings, up to 200 times faster than drum and pen plotters, according to the firm.

The 5010 is available in three versions: as a printer only, priced at \$5,000; as a plotter only, priced at \$6,000; and as a printer/plotter, priced at \$6,500.

The standard model for printing applications comes with a 64-character Ascii upper case set, using a 7 by 9 dot matrix font. Available as options are a 128-character Ascii upper and lower case set with line control characters and a 128-character set custom designed to user requirements, Gould noted.

The 5010 can be used on-line or off-line with most computer systems, the vendor added. Printing and plotting software packages are available.

Gould can be reached at 3631 Perkins Ave., 44114.



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CAI Universal Interfacing System Links Peripherals

IRVINE, Calif. — Computer Automation, Inc., (CAI) said it has "achieved a breakthrough in the high cost of uniting minicomputers and peripheral equipment" with the development of a low-cost universal interfacing system that exploits "an entirely new technique of distributed intelligence."

The Distributed I/O System is said to effectively eliminate the need for expensive single-use interfaces and solves the problem of packaging computer capability and custom devices into systems.

The system uses a single half-card called an I/O distributor and a set of cables to enable any member of the company's LSI computer family to communicate with any mix of up to eight parallel or serial devices, either input or output. Each cable contains a Picoprocessor, a small microprogrammed processor optimized specifically to control I/O devices. It has

Large 'Megabyter,' Smaller 'Naked Milli' Available From CAI

IRVINE, Calif. — Computer Automation, Inc. (CAI) has introduced both a large "Megabyter" minicomputer and a small computer said to bridge the gap between the micro- and minicomputer and called the Naked Milli.

The Megabyter, or LSI-2/60, has 224 instructions optimized for real-time communications and business DP applications, the firm said.

The LSI-2/60 uses the same Maxibus architecture as all CAI LSI computers and is compatible with existing CAI, software, hardware interfaces and processors, CAI said.

Two starter core memory configurations are available: 32K bytes with 1,200 nsec cycle time and 32K bytes at 980 nsec interleaved (two 16K-byte modules).

Memory configurations are available with optional 1 bit/byte parity and can be expanded to a maximum of 1M bytes, CAI said.

Further contributing to the LSI-2/60 performance is the availability of a universal interface system, the firm claimed.

The set of 224 microcoded instructions includes multiple hardware stacks, 31-digit decimal string arithmetic, direct bit manipulation, hardware cyclic redundancy check (CRC) and byte-string-move and compare instructions.

String instructions move up to 255 bytes at a time and include a string compare that compares string magnitudes and locates mismatched characters.

The LSI-2/60 is priced from \$9,600 in a starter 32K-byte configuration to about \$110,000 for the 1M-byte version with power fail/restart, autoload and real-time clock.

The Naked Milli (LSI-3/05), on the other hand, is said to be an upward-compatible, full-scale 16-bit bipolar MSI processor on a single half-card.

The LSI-3/05 does, however, have memory and I/O options, including card and paper tape equipment, line printers, rigid and floppy disks, CRTs, etc. with appropriate diagnostics and other software.

CAI's Distributed I/O System will allow the LSI-3/05 to communicate with most devices and peripherals, thus eliminating the need for expensive, single-use interfaces, according to the vendor.

Operating with a set of 93 microcoded instructions, the machine can perform a 16-bit add function in 6 μ sec, CAI added. Standard features include programmed I/O, direct memory address (DMA) and direct memory channel (DMC).

Software includes loaders, utilities, a debug package, the Omega conversational assembler/editor and Real-Time Executive. Programming support is provided by CAI's LSI-2-based disk operating systems.

With 1K byte RAM memory, the Naked Milli is priced at \$695.

a 250 nsec cycle time, is capable of transferring data, manipulating device control signals, monitoring device status and generating and responding to computer interrupts, the company said.

vides interrupts, controls data flow, checks the I/O device for errors and controls interface strobing.

Operating as a true distributed intelligence network, the Distributed I/O Sys-

Miniworld

The Picoprocessor is packaged in a small box, approximately 3 in. by 8 in., designed to mount near the peripheral it controls.

The I/O Distributor provides interrupt processing, clocks and buffering for up to eight intelligent cable interfaces. Each intelligent cable is a ribbon cable using a standardized three-state electrical interface to a picoprocessor embedded in the cable near the peripheral.

The Picoprocessor converts standard I/O communications for each device and pro-

tem transfers data concurrently on all channels directly to or from memory using direct memory channels.

Because Picoprocessors are microprogrammed, only a small number of different versions are required to interface to a wide range of standard and special-purpose devices. There are two basic Picoprocessor types: a parallel Picoprocessor which is said to interface to virtually any type of parallel TTL device and a serial Picoprocessor in two versions for concurrent loop or EIA interfaces.

The parallel Picoprocessor can be micro-coded to control 8-bit output, 8-bit input or 16-bit input devices. Standard programs are available for paper tape readers, paper tape punches, line printers, card readers and various general-purpose interface disciplines.

The serial current loop Picoprocessor controls a standard ASR Teletype including automatic tape reader and motor on/off control. The serial EIA Picoprocessor controls CRTs or modems using five-bit through eight-bit characters, with or without parity, at any of the standard communication rates.

In parallel format, the system communicates with standard peripherals such as card readers, line printers, paper tape equipment and printers as well as user-developed devices such as analog-to-digital converters and point-of-sale cash register terminals.

The I/O distributor is priced at \$380, intelligent cables are \$145 each. CAI is at 18651 Von Karman, 92664.

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Communications to 360s, 370s Allowed by Adapter

TROY, Mich. — System Associates, Inc. has introduced a family of communication devices called the Long Line Adapter (LLA). Plug-to-plug compatible with IBM's sensor-based control unit, the LLA allows "any minicomputer to communicate with an IBM System/360 or 370 at 277 kbyte/sec within a mile range using single-wire, coaxial cable, the firm said.

In addition, the LLA can communicate with up to 64 computers. The LLA's ultrahigh-speed data rate and error-free transmission allows the user to remove peripherals such as disks from remote minicomputers and utilize the host system's disk storage units, the company added.

The LLA can be used to interface any minicomputer to IBM's newly announced Distributed Intelligence System. This opens up to a mini the "power and scope of 370 data base facilities," according to the vendor.

Other models of the LLA can be used for remote I/O. In this

application, digital and analog sensors can be multidropped on a single coaxial cable. Aslo, an RS-232 interface is supported. Prices range from \$1,200 to \$5,000. System Associates is located at 55 Park St., 48084.

Micro Prototypers Aid In Choosing Hardware

HAUPAUGE, N.Y. — Three microprocessor prototypers from Promemco, Inc. are designed to allow users to determine the microprocessor hardware they will need for their applications and to develop the software for it in advance.

The prototypers, which the vendor described as "very flexible microcomputers," are applicable to process control, communications, instrumentation, machine control, word-processing and other applications areas, the firm said.

Promemco's Model 8PS prototyper is expandable to eight input ports and 24 output ports, with provision for memory expansion to 16K bytes of random-access memory (RAM) or read-only memory (ROM).

The Model 8P can manage three input ports, three output ports and up to 8K of RAM or ROM.

The Model 8PS costs \$2,700; the 8P costs \$2,400; and the 8M costs \$1,450 from the firm at 181 Bridge Road, 11787.

Light Pen Reader Captures Bar Code

FRANKLIN, Mass. — Optical pen readers from Identicon Corp. can be programmed to read any existing bar code, including the Universal Product Code and other codes with a varying number of digits, the vendor said.

The pen has the capability of providing eight parallel data bits which are transmitted by up to eight output strobe lights. Control signals are handled by four input lines.

The pen costs \$1,000 from One Kenwood Circle, 02038.

Datum Controller Replaces DG Units

ANAHEIM, Calif. — Datum, Inc.'s 4091-I disk controller is designed as an alternative to Data General's own 4046 and 4057 control units.

The 4091-I fits into a single slot in the mainframe of Data General minicomputers. It can be modified to control removable disk, fixed and removable disk and cartridge-type units, as well as larger IBM 2314-type units, Datum said.

The device is software-compatible with the Pertec D3000, Wangco F or T, Diablo 30 or 40, Century Data's Trident 114 and Control Data Corp. 9746 drives as well as Datum's Series 44 disk

drives, the firm noted.

The 4091-I is also cartridge-compatible with Data General's 4047A or 4047B drives and Diablo 30 or 33 drives, the firm added.

Formatting of the 4091-I cor-

responds to the Data General pattern, which is single-sector addressable with 250 word/data sector and 12 sector/data track.

The controller costs \$2,700 from the firm at 1363 S. State College Blvd., 92806.

DSD Controller Fits DEC, CDC

BERKELEY, Calif. — Data Systems Design's (DSD) 240 disk-memory controller for Digital Equipment Corp. (DEC) PDP-8 and PDP-11 minis is now available with the 60M-byte Control Data Corp. CDC 9746 disk drive.

A 16-word buffer in the con-

troller permits other direct memory access devices to monopolize the bus for up to 180 μ sec without interfering with data transfers, the firm said. The drive and controller are priced at \$13,600 for PDP-8s and \$13,900 for PDP-11s. DSD is at 1122 University Ave., 94702.

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Centronics Printer Has Three Widths

HUDSON, N.H. — The Centronics Data Computer Corp. Model 306C impact printer can save paper by printing 80-, 96-

or 132 columns on an 80-column, 8-in.-wide format, the vendor said.

A combination of any two of those three column line widths can be specified when ordering the printer, Centronics noted. Either a software command or manual switch can select between-the-line lengths.

5 by 7 Matrix

The 306C multicopy printer uses a 5 by 7 dot matrix technique, with a 7 by 9 matrix available as an option. Paper can be fed from the bottom or rear of the printer.

With 80 col/line (10 char./in.),

the 306C operates at 100 char./sec; with 96 col/line (16.5 char./in.), 165 char./sec are printed.

The 306C can be used as a receive-only 1,200 bit/sec communications teleprinter when printing 16.5 char./in. Such optional communications interfaces as pollable multidrop interfaces or communications adapters with buffer, ACK/NAK and automatic answer are available.

Centronics said it can interface the printer, which sells for \$2,360, to most popular mini-computer lines. The firm is located here in Hudson, 03051.

Miniworld

GA System Automates Warehouse Inventories

ANAHEIM, Calif. — A turnkey package for automating the inventory procedures in public warehouses is now available from General Automation, Inc. (GA).

The GA Automated Inventory

System is said to generate all the necessary invoices, receipts and bills of lading and maintain an up-to-date running inventory record.

A minimum system includes a GA 18/30 computer with 8K of core memory, a console teletypewriter, a 300 line/min printer, a 512K-word disk for the operating system, an additional 512K-word disk for inventory data storage, I/O devices and the automated inventory system software.

The basic system is priced at \$55,750. Additional remote teletypewriters can be installed for \$1,000 for a controller plus a monthly rental of \$120 per console.

The system was originally designed and installed in a large public warehouse facility of American Warehouses, Inc., in Houston, Texas.

American Warehouse's system, which includes two 2.5M-byte disks, four remote teletypewriters and a 300 line/min printer, handles 120 manufacturing customers.

GA is at 1055 S. East St., 92805.

Alpha-16 Gets Display Interface

SAN DIEGO — The Model BP-732 graphics display interface from Megatek Corp. allows users of Computer Automation (CA) Alpha-16/LSI minicomputers to convert laboratory oscilloscopes or X-Y monitors into full vector graphics displays, the vendor said.

The BP-732 occupies a single slot in the minicomputer. It contains its own semiconductor refresh memory, vector generators and intensity control circuits to provide "flicker-free displays" of points, vectors and alphanumeric, Megatek said.

Memory may be expanded from 256 vector/point to 1,024 vector/point.

The cost of the BP-732 ranges from \$1,295 for the 256 vector/point, 8-bit model to \$2,195 for the 1,024 vector/point, 10-bit model. Megatek is at 1055 Shaft St., 92106.

DMTP-3 Print Fits

2½-In. Adding Tape

SHELTON, Conn. — Practical Automation, Inc.'s DMTP-3 is a plug-in dot matrix serial impact printer offering alphanumeric line printing on 2-1/2-in. adding machine tape.

Interfaces can be serial, parallel, parallel binary and RS-232C, the firm stated.

At 100 char./sec, the DMTP-3 prints a 7 by 5 dot matrix on to single- or double-ply roll or single-ply fanfold. For a full line, this takes 2.3 line/sec.

The DMTP-3 costs \$195 from the firm at Trap Falls Road, 06484.

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AED Disk Pack Ups PDP-11 Memory

SUNNYVALE, Calif. — A mass storage system for the Digital Equipment Corp. (DEC) PDP-11 from Advanced Electronics Design (AED) is said to be able to control as many as eight 80M-byte disk packs.

The AED 8000 can expand the capabilities of PDP-11 installations, for example, in scientific applications where large memory storage is necessary. The system is a plug-compatible alternative to the DEC RP11-C, AED said.

To attain speed and flexibility, a microcontroller replaces the typical hard-wired formatter. The microcode in the controller can be reprogrammed to allow the system to work with different types of minicomputers, AED said.

As many as eight Control Data Corp. storage module drives, each with 80M-byte capability, can be daisy-chained in the AED 8000. Specifications of the drive include a data trans-

fer rate of 1.2M byte/sec and an average access time of 30 msec. The disk drive and all electronics fit in less than 16 inches of vertical rack space. As an option, the AED 8000 can interface with up to four CPUs simultaneously.

The multiple port feature is transparent to the computers. Each is assigned its own set of bus address registers which the CPU software can access without regard to any other CPU, the firm said.

The AED 8000 uses a soft-sectored format for increased versatility. Where compatibility is not required — with non-DEC software, for example — sector length can be varied to any practical size on a track-by-track basis.

Sequencing is automatic with the new system from sector to sector and from surface to surface on a cylinder and between cylinders.

Price for a complete system starts at \$17,500 from the firm at 754 Pastoria St., 94086.

Miniworld

Speaker Cites Low Cost Factor For Retailers' Move to Minis

QUEBEC CITY — Distributive computing is going to be a way of life for retailers, according to Len Farano, who spoke at a session on the future of minicomputers in retailing at a recent conference here.

Farano, executive vice-president of Gambit Management Strategies, Inc., described the evolutionary use of minicomputers in retailing from the single-purpose functions of point-of-sale (POS) collectors to the sophisticated use of minis for on-line purchase order management systems.

He cited several reasons for this movement by retailers toward minis, including:

- The relative ease of getting an on-line system on-the-air using a minicomputer vs. the addition of an application to a large mainframe.
- The low cost of using dedicated minis vs. the addition of expensive hardware and software to existing computers.
- The need for information to be processed in real-time, on-line environment, vs. a batch environment.
- The ability to put significant processing power in the hands of people who understand the application and business requirements.
- The advantage of not being subject to "one-machine" scheduling.

"There are several myths associated with minicomputers which should be exploded," Farano said.

"One is that they are small, limited-capacity machines. In fact, the range of storage and peripherals currently available can extend far into the range of traditional computer systems.

"Another myth," he continued, "is that less systems work is required and that minis are easier to program. In truth, the same amount of systems work should be spent designing applications on minis as on any equipment."

Programming is not necessarily easier, especially for those manufacturers who provide only specialized Assembler-level languages for their hardware, he said.

"The major time saved in getting systems on-the-air," he suggested, "is the ability to dedicate the machine's usage to one or two related applications and the improved testing environment brought about by the interactive and interpretive languages available.

"Many retailers are requesting that firms like ours provide turnkey systems for specific application areas. The greatest interest today is being gathered in point-of-receipt systems.

"The ordering, receiving, checking, marking and distributing functions can all be handled on a dedicated minicomputer. These systems can provide video display capability in a real-time environment and can expedite the movement of goods from receiving to the selling floor.

Graphics Capability Provided for Novas

LEXINGTON, Mass. — The Model 200 graphics display from Lexidata Corp. is designed to provide Data General's Nova minicomputer users with a mixed display of both graphic images and alphanumeric characters.

The Model 200 uses a 256 by 240 dot matrix, with each dot individually addressable.

Driver software is available for SOS, RTOS and RDOS operating systems, Lexidata said. The software is Fortran-callable and provides character generation, vector generation, graphic display and selective erase of any part of the display, the firm added.

The Model 200 costs \$2,595 from the firm at 807 Massachusetts Ave., 02173.

Tektronix 31 Gets Printer Interface

WOBURN, Mass. — The Printec-100 serial impact printer from Printer Technology, Inc. can now be linked to the Tektronix Model 31 programmable calculator's RS-232C interface.

The Printec-100 costs \$3,145 from the firm at Sixth Road, 01801.

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Datum Transports Run Unattended

ANAHEIM, Calif. — Dual cassette transports allow Datum, Inc.'s Universal Digital Recorders to offer automatic transport transfer at end-of-tape (EOT) in both write and read modes, the vendor said.

The Models 4002 and 4002-R have RS-232C or IBM 2741 communications I/O, switch-selectable to 9,600 bit/sec; teletypewriter current loop I/O at 110

bit/sec; and 8-bit parallel I/O.

Data stream control characters provide remote control. Bidirectional file and record capabilities let users search and edit recorded data, the firm said.

The Model 4002 costs \$3,495 and the Model 4002-R, which is rack-mountable, costs \$3,595 from the firm at 1363 S. State College Blvd., 92806.

ROM Board Eases PDP-8 Loading

LOWELL, Mass. — A read-only memory (ROM) binary loader board from Graphic Systems, Inc. reduces the number of operator steps in loading programs on the Digital Equipment Corp. (DEC) PDP-8, according to its vendor.

Because the loader is in ROM it cannot be accidentally altered by program bugs or inadvertent operator errors, the vendor

said. Additionally, the loaders are self-starting in any location, further reducing the chance for operator error, the firm noted.

The ROM binary loader board is Omnibus-compatible. With paper tape loaders, it costs \$400 from the firm at 217 Jackson St., 01852.

'Master/Slave' Holds 12.8M Bits

COSTA MESA, Calif. — Orbis Systems' Master/Slave diskette drive system can provide up to 12.8M bits of storage by interfacing three 74S "slave" drives to one 74M "master" drive.

The disk drive system is compatible with a Remex controller, Orbis noted.

The 74M master drive contains electronics for interface, read, write, control, step and direction, data separator and sector generator, the firm said.

The 74S, a lower-cost unit with minimum electronics, connects into a sec-

ondary interface on the 74M.

The 74M/74S units are mechanically independent. A 74M will operate in place of any 74S, Orbis said.

Both the 74M and 74S are IBM-compatible and offer an unformatted data capacity of 3.1M bits per disk, 250 bit/sec data transfer rate, and 6 msec access time track-to-track with interrupt step sequencing.

The 74M costs \$800 and the 74S costs \$695 from the firm at 3303 Harbor Blvd., 92626.

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IMP-16 Gets Floppy System

SANTA CLARA, Calif. — National Semiconductor Corp. has added a floppy disk operating system to its IMP-16 Microprocessor Development Systems.

Under the disk operating system (DOS) source programs are written and edited at the system keyboard and stored directly on floppy disk using the source editor.

The source program may then be assembled under operating system control with a single command, the ven-

dor said.

The DOS will run on any IMP-16P or IMP-16L with 8K or more words of memory. The dual-drive floppy disk system provides 5M bits of storage for system software and application programs, according to the vendor.

The DOS package includes a dual-drive floppy disk, interface, cable, DOS software and documentation. The package costs \$5,500 with deliveries beginning in April from the firm at 2900 Semiconductor Drive, 95051.

Automating Hospital Information

Spectra Medical announces a new on-line real-time Medical Information System built around a dedicated minicomputer.

Five years ago, a team of medical specialists and computer technologists pooled their talents at Spectra Medical Systems to help solve the growing problems of hospital communications and record-keeping.

The design and programming are done. A 350-bed hospital has installed the system, called the Spectra 2000. We thought you'd be interested in hearing what it does and how.

What the Spectra 2000 does

Working with a lightpen at 4-color CRT interactive terminals, hospital personnel handle much of the patient record-keeping that used to be done on paper. The Spectra 2000 also electronically stores, sorts and reformats all patient information in its memory. Admit, discharge, transfer. Medical order entry. Medication scheduling. Medication charting. Permanent chart document preparation. Nurse scheduling. Current census. Patient drug profiles. Staff requirement reports. Utilization review reports. Charge capture. And the system software contains an extensive drug interaction library that doctors and pharmacists find useful.

The Spectra 2000 is secure. It is accessed by a six-character password at the data station keyboard. Only a valid password gains access to the system. And users are limited to information appropriate to their code.

Printed orders are automatically generated for confirmation at the station where they are entered. The system simultaneously transmits requisitions to all appropriate ancillary services. Information entered into the system is automatically entered into

scheduled reports (medication schedules, bed availability, nurse staffing, utilization review, patient drug profile, etc.) in real time and is printed automatically or at the request of authorized users. And complete capture of cost information allows all patient charges to be passed easily to the hospital business office system.

System components

The Spectra 2000 MIS is built around a Data General Nova 840 CPU with up to 128K (word) memory. It interfaces with Century Data 2314-type disc drives, Alpha Data 4M-byte fixed-head disc drives, Wangco tape drives, and 50 kbit/sec Computer Communications, Inc. multiplexers. It uses 4-color CRT with lightpen and keyboard plus a Versatec electrostatic 600 line/min printer at nursing stations and appropriate ancillaries. All information is communicated clearly, without delay.

More information?

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If you're involved with hospital information and would like to observe the system in action, please give us a call or write Frank Parrish, Spectra Medical Systems, Inc., 1121 San Antonio Road, Palo Alto, CA 94303. Phone: (415) 964-4630. We'll be happy to arrange a demonstration for you.



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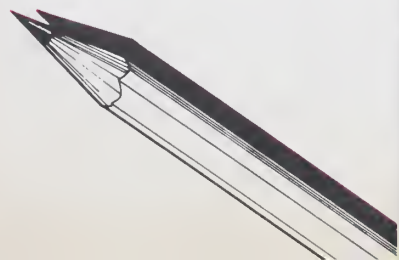
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CIRCULATION DEPARTMENT

CI Notes

Despite Telex Reversal

Firms Plan to Pursue Suits Against IBM

DPF Agrees to Supply Funds To Finance Memorex Leases

SANTA CLARA, Calif. — DPF, Inc. has agreed to provide \$10 million of financing for customer leases of Memorex's 6000 series of semiconductor add-on memories.

Memorex will install and maintain the equipment, and marketing will be done by Memorex with the assistance of DPF.

Shugart Licenses Floppies to Univac

SUNNYVALE, Calif. — Shugart Associates has received a contract from Univac involving a license for Univac to manufacture the SA900 and SA902 flexible disk drives.

The contract also includes an option to purchase the disk drives.

Large Attendance Expected at NCC

MONTVALE, N.J. — More than 800 booths, representing 90% of the exhibit space, have been reserved so far for the National Computer Conference (NCC), which will be held May 19-22 in Anaheim, Calif.

About 237 organizations, 26 of which are participating in NCC for the first time, plan to exhibit.

Some of the companies that have reserved space are: Ampex Corp., California Computer Products, Inc., Control Data Corp., Data General Corp., Data 100 Corp. and General Automation, Inc.

Others include Hewlett-Packard, IBM, Interdata Corp. and Xerox.

The conference committee expects about 30,000 attendees at NCC.

Utilities Seen Increasing T/S Use

MINNEAPOLIS — Electric companies are expected to continue the trend of increased use of data service networks in 1975, said Newton H. Fisk, vice-president of Control Data Corp.'s utilities nuclear industry office.

Electric utilities spent more than \$50 million for data services in 1974, a 20% gain over 1973, he estimated.

The trend should continue with another 20% gain this year, Fisk predicted.

Supershorts

NCR plans to establish a second microelectronics production facility. Production in the leased plant in Colorado Springs will begin in the fourth quarter.

Decision Data Computer Corp. has delivered its 15,000th data recorder, an 8010 interpreting data recorder, to Hoffman-LaRoche, Inc.

Data Disc, Inc. and Bright Industries, Inc. will be closed from Dec. 21 through Jan. 5. Scheduled delivery of material due during this period will be rescheduled for delivery starting Jan. 6.

Informatics, Inc. has granted marketing rights for Production IV to Sema of Paris.

Data Dimensions, Inc. has been named national distributor by Omnitech Corp. for its data couplers and modems.

Infonational named Lawdan Pty. Ltd. as Australian marketing representative for its software.

Electronic Memories & Magnetics Corp. delivered its 100th Model 3650/155 to the Ford Motor Co.

MSI Data Corp. has selected Acroscan Corp. optical slot scanners for use with its Astros Supermarket system.

By Molly Upton
Of the CW Staff

NEWTON, Mass. — Although none called the reversal of the Telex-IBM decision encouraging, firms that have filed antitrust suits against IBM are prepared to grit their teeth and pursue their claims.

Memorex President Robert C. Wilson called the reversal "disappointing but by no means determinative of the \$3 billion antitrust suit that Memorex has brought against IBM."

Jay Langner, president of Hudson General, said there is "every probability we will continue our suit."

Jim Rush, president of Transamerica Computer Corp., said as far as he knows there "is no reason not to pursue our suit. I think the lower court's opinion was correct."

"Yes, in capital letters, we're going to continue the case," said Joseph Millimet, outside counsel for Sanders Associates.

Jim Pyle, assistant to the president at California Computer Products (Calcomp), admitted "we would have preferred [that the decision] go the other way."

But he added, "We've always said that whether Telex won or lost we would pursue our suit because we thought we had a good case."

"Of course," Pyle admitted, "we didn't expect Telex to lose. We thought maybe the appeals court could always change the judgment around a little, but we didn't really expect it to be overturned."

Disbelief was also voiced by A.G.W. (Jack) Biddle, executive director of the Computer Industry Association.

"I'm still in a state of shock," Biddle said. "As one of the relatively few people who have read every piece of paper involved in that case, I find the appeals court decision to be quite surprising when

IBM's own internal papers show clearly that it saw the plug-compatible market as a distinct, unique market."

'Relevant Market' Issue

Calcomp's lawyers will have to review the complete decision, Pyle said, and "we'll have to find out what we have to do to prove to a court that there is a relevant market which the court can understand and accept and that IBM has violated the antitrust laws."

"Apparently the appeals judges couldn't find a violation because they couldn't find a relevant market," Pyle observed.

Biddle also focused on the "relevant market" issue. Noting he thinks it is important to see whether the decision was 3-0 or 2-1, he added that "it certainly casts a cloud over each and every segment of the industry because, if Telex's allegations were in fact true and this decision holds, it gives IBM license to selectively deal with each segment one by one and put [each] out of business."

Although the court's full opinion was not available when comments were being solicited, Rush said it looked on the surface the court decided Judge Christensen had misdefined the market.

"But nuts, there were quite a number of firms specializing in [the IBM plug-compatible] market. Hundreds of millions of dollars of products went into that market and it's just inconceivable to me that the court would not find that it was an appropriate market," Rush said.

"The thrust of the decision as I understand it," he added, "constitutes a grave threat to at least the smaller new entrants who are trying to enter the DP market in competition in any way, shape or form with IBM."

"I don't know who out there is going to

CIA Heads for D.C.

LOS ANGELES — The Computer Industry Association (CIA) is moving its headquarters to Washington, D.C. "to increase our efforts to work with Congress in reviewing the applicability of the Sherman Clayton Act as written in the 1890s to today's high-technology, concentrated industries," said its executive director, A.G.W. (Jack) Biddle.

"The fact that [Judge Christensen] spent a year and a half of his life learning intimately the details of that particular set of issues, deciding one way and [then] the appellate court deciding 180 degrees differently says to me and to my association that steps must be taken to clarify and update our antitrust laws," he explained.

be funding these small companies if, in truth, IBM can crush whomever it may feel a reason to do so," he said.

Not a Tag-Along Case

Memorex's Wilson noted the Memorex suit is not simply another Telex tag-along case since it includes matters not covered in the Telex case.

Memorex intends to vigorously pursue all of its claims against IBM, Wilson said. "This includes continuation of extensive efforts underway in the preparation of a computerized evidentiary index data base," he said.

The Sanders "complaint is not a Telex-type complaint," Millimet said, adding attorneys were aware when drafting the complaint that the Telex decision might be modified.

"We never depended on the opinion," he said.

Biddle Warns of Future IBM Schemes

KANSAS CITY, Mo. — IBM has several plans up its sleeve that will enable it to lock in its customers and lock out the rest of the industry regardless of the outcome of the current efforts to curb its monopoly powers, A.G.W. (Jack) Biddle, executive director of the Computer Industry Association (CIA), told a meeting of the Computer Dealers Association.

Biddle warned his audience that proposed remedies to the monopoly force of IBM are based on past, not future, tactics of the corporation.

Looking ahead and outlining the alternatives IBM has at hand to enable it to maintain its set annual increase of 14% in revenues, Biddle told attendees "it is of paramount importance that you and all other participants in the data processing industry speak up before the images in the crystal ball become reality."

"We cannot solve the problems of tomorrow with yesterday's solutions. You and I and others like us must decide: Is the computerized world of tomorrow to be a sole-source, single-supplier world with but one company — IBM, or are we going to have a competitive industry where the user has choices and where the suppliers succeed or fail on their own merit?"

Two Options

Even if the Justice Department succeeds in its current antitrust action against IBM, either by consent decree or final judgment, IBM has two options, Biddle pointed out.

The first is to accelerate the timetable for its Future Systems (FS). Given one year for the trial and another for a decision, then a possible appeal to the Supreme Court if IBM finds the decision unacceptable, it may well be "toward the

end of the decade before relief is granted.

"With FS on the open market, the relief requested by Justice may well become a moot point," Biddle said.

"IBM's other alternative is to opt for regulation," he said.

These options would allow IBM to circumvent antitrust regulations or pre-scripted judgments that would be based on past circumstances, Biddle said.

Biddle discounted as ineffective any plan to restructure IBM that leaves the "Data Processing Corp." (large systems), "General Systems Corp." (small systems) and "Office Products Corp." intact, since in each area these groups or companies "continue as the dominant monopolies in their respective fields."

By accelerating the FS timetable and by selling its "computerations" system consisting of single-source data processing, communications and affiliated services and products, IBM will be able to lock out independent suppliers in these areas, Biddle said.

Through the use of its satellite system and Carnation, or the 3750, which is a sophisticated electronic private branch exchange (PBX) that Biddle said will soon be marketed in the U.S., IBM will be selling "total end-to-end DP and telecommunications services."

FS software, with its principal features of "applications-oriented firmware, symmetric multiprocessing, integration of I/O functions and memory and increased performance," completes the IBM strategy puzzle, he said.

"Biddle speculated it will 'be difficult to separate the hardware of the system from the software; much of the application software will be placed in firmware as time progresses; and more organization of information will be performed within

the peripheral subsystem."

"I cannot argue against technical innovation, for in the computer industry change is a way of life. However, the timing and secrecy surrounding IBM's new offerings should not be used to stifle competition, lock in the user and perpetuate its monopoly," Biddle said.

IBM probably also plans to physically bundle as much as possible of the mainframes and memories together in the same box and use "technology" — or Synchronous Data Link Control (SDLC) — "as the bundling device to tie it all together and prevent competitive interconnection."

Biddle expects SDLC will vary from "customer to customer, from IBM product to product, and it may vary within a product group itself."

"It seems that IBM is not only allowing for maximum flexibility to meet customers' needs but it also intends to make it possible for equipment of other than IBM manufacture to interconnect with the system or network."

IBM could also try to convince customers "the only secure system is a sole-source system."

"But the coup de grace for free enterprise in the computer industry is a simple trick IBM has learned from AT&T and Xerox. It's called functional pricing, and it's just around the corner," Biddle said.

Functional pricing, or charging by the number of transactions, may be for an entire system or on a box-by-box basis but it will nevertheless be extremely low by today's standards," he noted.

Functional pricing "could be the final strategy that prohibits any other supplier (CPU, peripheral or terminal) from gaining access to the IBM network."

(Continued on Page 33)

'Naked Milli,' 'Picoprocessor' Extend CAI 'Compatible Family'

IRVINE, Calif. — From the folks who brought you the Naked Mini comes some more new monikers and concepts — the Picoprocessor, the Naked Milli and the Megabyter.

Computer Automation, Inc. (CAI) claims to have the "broadest capability in a compatible family," ranging from its newly announced Megabyter, which is "almost as big as the biggest 16-bit mini with up to 1M byte of memory and 224 instructions, takes its place at the large end of CAI's line, previously known for its small products.

"We created the Megabyter for two reasons," said Sol Zasloff, vice-president of marketing.

"One is because we believe there is new business for us out there for larger systems with more power — in terms of throughput — and two, because we want to offer our present customers the opportunity to grow further if it makes sense to them."

Many customers frequently start with the company's smallest computers and gradually work their way up into larger members of the family as their experience with the marketplace grows and their clients demand new and additional features, Zasloff added.

"They spend a lot of money on software and interfaces and then suddenly discover their marketplace requires an even larger version of whatever they're doing," he said.

"By providing yet another and significantly more powerful level of processing strength, we believe we are making their investment virtually immune to obsolescence."

The Naked Milli opens the door at the other end of the processing spectrum to users who want or need to start small but recognize future requirements for growing into larger systems and who want that growth to be an orderly upward progression without reprogramming problems,

Wema Seeks Change In Tariff Affecting Goods Made Offshore

PALO ALTO, Calif. — The Western Electronics Manufacturing Association (Wema) is attempting to organize a co-operative industry effort aimed at modernizing the tariff legislation which affects companies with offshore manufacturing facilities.

Wema's target is Section 592 of the Tariff Act of 1930, which the group's Vice-President, Eben S. Tisdale, termed "a draconian and inflexible statute."

Under the present law, a mistake in classification or a wrong valuation of goods imported into the U.S. results in a penalty assessment in the full amount of the domestic value of the goods, regardless of the amount of duty owed or degree of culpability.

Securities Data Bank Goes Out of Business

NEW YORK — A firm which maintained a private data bank on stolen, missing and counterfeit securities went out of business Dec. 31, claiming lack of support from major banks.

Securities Validation Corp. (SVC) enabled banks and brokerage houses to check on securities presented to them which aroused suspicion.

When operations ceased, SVC had information on \$11.4 billion worth of stolen and unaccounted-for securities.

Henry duPont, the firm's founder, said the absence of his company will leave "a wide opening for organized crime to move in and circulate stolen stocks."

Zasloff said.

The Milli will enable a customer to grow right up through the line of computer power. There's no micro which lets him do that," he said.

"Our machines are compatible — from the micro level all the way to the top, and nobody else has that capability," Zasloff said.

A half-board module, the I/O Distributor, connects cables containing very small processors, called Picoprocessors, to various I/O devices. An I/O Distributor can handle up to eight serial or parallel peripheral devices.

"Everybody spends all their time thinking about the processor, although processors are only part of a system," he said. "While all this attention is being focused here, everybody forgets that the user is left with the problem of 'how do I attach the processor to my product?'"

Orders & Installations

Bethlehem Steel Corp. has ordered 48 96-column card data preparation units from Decision Data Computer Corp. for installation in 12 sales centers and offices.

Wells Fargo Bank has ordered over 1,600 teller inquiry terminals from TRW Electronics as part of its branch terminal system.

The Voice of Prophecy, a radio and television religious broadcasting service operated by the Seventh Day Adventists, has ordered a Univac 90/30 system.

Spartan Stores, Inc. has ordered nine NCR 255 supermarket systems to implement the conversion of five of its stores to electronic checkout systems.

The Western Division of Intercraft Industries Corp. has ordered a Honeywell Series 60 for installation at its picture frame manufacturing and distribution plant.

Wayne State University has installed a

Burroughs B 1726 system to be used in both accounts payable operations and computer science courses.

Logicon-Intercomp, Inc. will install three Logigraphic prepress newspaper systems at Landmark Communications, Inc.

Corra Plumbing Co. has installed a Burroughs B 700.

Atlanta Federal Savings and Loan Assoc. has ordered an NCR Century 251 computer and 61 NCR 270 financial teller terminals.

American Computer Tax, Inc. has installed a Univac 1900 Computer-Aided Data Entry system for use in processing tax returns.

Logicon-Intercomp, a subsidiary of Logicon, Inc., has received an order for six peripheral equipment systems from the Mobil Oil Co. for use with IBM 1130s.

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As Result of Telex Decision

IBM-Justice Consent Decree Now Likely, Analyst Says

NEW YORK — A consent decree with the Justice Department in the government's current antitrust case which would possibly involve the split-off of the General Systems Division (GSD) and settlement with at least one plaintiff presently suing IBM on antitrust grounds are likely now that the appeals court has ruled in favor of IBM in the Telex case, said Harry Edelson, senior analyst at Drexel Burnham & Co.

"The [latest] Telex decision is the key," he said, since it now enables IBM to talk to the Justice Department and others from a position of strength.

"The Telex decision sort of opens the floodgates for IBM to go ahead with the rest of its strategy, which now calls for a consent decree and settlement of its private antitrust cases," he said.

Explaining why he thinks a consent decree is likely, Edelson said, "I don't

think the Justice Department can take a political defeat of this sort, carrying it all the way and perhaps losing.

"It would really be a black eye for them and would put all of their antitrust actions in dire jeopardy.

"I think if they can get a consent out of IBM and if IBM is still of a mind to divest itself of General Systems, which I think it will do, I think IBM would do it," he said.

If IBM split off the GSD, it would help the entire computer industry and the Justice Department would get some plaudits for divesting IBM of something, Edelson said.

Because "GSD is the entry level for IBM," its separation "would really hurt IBM more than the 7% of its revenue would indicate."

The GSD is growing faster than the rest of IBM and plays a key role in attracting

new users into the IBM fold, he explained.

Before the Telex appeal decision, IBM might have had to give up both the Office Products Division, which accounts for about 18% of revenues, as well as the GSD, but now IBM would settle to give up only one, he said.

Sees Future Settlements

"I now look for IBM to settle with Memorex, or anyone who has been nice to it," Edelson said. "I think IBM might agree to pay court costs or give them a few million dollars and settle as long as it doesn't look like it's admitting any guilt so the Justice Department won't take any inference from it.

"I think we'll see a few settlements here," Edelson predicted.

Why will IBM settle? Because the chances are good the Supreme Court will

review the Telex issue this spring, he said.

"So this is the time IBM has the cards in its favor and can reach settlements very cheaply right now and break the back of a lot of these cases," he explained.

Edelson said he thinks IBM will pick a couple of weak companies to settle with, which in turn will get other firms in line to also settle.

"But if IBM were to wait three or four months, and the Supreme Court were to accept the Telex case, some of the companies, especially the ones that have been very tough with IBM," would decide to wait until the outcome.

"It's in IBM's favor to remove the cloud over it."

The "overhang" on IBM stock, if it's worth only one point, is worth more than all the lawsuits put together, he noted.

One point is worth \$147 million to IBM because there are 147 million shares of stock, he said.

Breaks Up Cloud

The latest decision on Telex could benefit the whole industry, Edelson said, since it breaks up the cloud, or prospect, of having five IBM firms instead of one with which to deal, and it is less likely the Justice Department will win its case now.

The Justice Department blundered, Edelson said, when it opened the case to include peripherals and leasing, since IBM has now won on the peripherals issue.

On leasing, IBM already won the Greyhound case, which reopened the case based on the Telex decision.

Edelson emphasized that all mainframe stocks should benefit from the decision, as the market likes uncertainty least of all and things are surer now.

He predicted that those stocks that have had higher price earnings ratios than IBM will continue to maintain them.

CIA's Biddle Warns Of Future IBM Plans

(Continued from Page 31)

"Such initial benefits to the end user could deter any kind of government pressure to revert to more classical techniques of interfacing and pricing," Biddle added, warning that although not apparent in the short term, the long-term effects are intended to be "termination of competition in large segments of the computer and telecommunications marketplace."

Regulated Industries Protected

On the other hand, IBM might opt for regulation, Biddle said.

"A regulatory commission would shield IBM from competition in the same way the [Federal Communications Commission] now protects AT&T — by limiting entry into the industry, by assigning customers to firms and by enforcing minimum price schedules for DP products."

Biddle also noted IBM can "justifiably claim" it "owns, operates, or services 75% of the central nervous system of the U.S. and IBM can make much the same case for its own regulation today that AT&T made decades ago."

Present Views

Regardless of which path IBM or the court takes, the industry should be heard, Biddle said. The Tunney Bill allows public access to and participation in consent decree settlements.

If there is a trial, there will be a separate trial on the relief issues "and you should, as a concerned participant, be prepared to present your views to the court on the issues that will shape our industry for the next 20 years," he told the audience.

If IBM seeks to become a regulated authority, the rest of the DP industry should speak up and make its views known, he said.

For the past four years we've been developing our powerful GCS 2100 system and building its software support and service program. And we've never taken the time to tell enough people what a great system it is.

How efficient it is (average of 80% reduction in errors — 35% to 85% faster document handling).

How reliable it is (less than 1% downtime).

How simple it is (operator training time less than 8 hours).

Or how economical it is (10% — 40% savings in data preparation costs).

And our competitors have loved us for keeping it such a secret!

The GCS 2100 is a complete data entry system: it lets you collect and edit data at the source (data is actually edited while it is being keyed).

Store the data on disc. Then transfer the clean data to an output media like magnetic tape.

(Conversely, data already on tape or cards can be re-submitted to the GCS 2100 for editing, reformatting, etc.)

By editing input data before it goes to disc storage, the GCS 2100 lets you quickly spot errors that could have become costly.

The GCS 2100 can interface up to thirty-two Touch-Tone® telephones. Card readers. Medium and high speed line printers. Four-tape drives. Four fixed or moving head discs.

All on a single system.

The GCS 2100 provides extensive I/O functions that allow you to transfer data to and from disc storage and other I/O devices, and provides an audit trail (comprehensive statistical reports aid in monitoring the system and the operator's performance), all with minimum impact on a supervisor's time.

The GCS 2100 can accommodate up to 64 local or remote terminals: local terminals can be located up to 2500 ft. from the system's CPU. You get faster, more accurate data entry for functions like payroll, shipping, receiving and manufacturing, because the person most familiar with the data does the keying. (Note: we can supply a typewriter keyboard and a special CRT format so this person doesn't have to be a keypunch operator.)

In addition to data entry from local terminals, the GCS 2100 offers data entry from remote terminals (it can handle up to five remote terminals over one dedicated telephone line); Touch-Tone® data entry; remote batch communications; and word processing.

A Programmable Extension Package (PEP)

extends the power and the flexibility of the 2100 system: up to 255 PEP tables provide capabilities like automatic data insertions; range and value checks; table look-ups; logical tests; character expansion (the operator keys S.D., South Dakota is generated on output); and automatic format switching.

And because these tables are not job assigned, they can be used on several different jobs. (Note: no programming experience is needed to work with PEP.)

A library of over 100 special edits is also available. It handles things like field relocation; special balancing routines; manipulation of constants; and output editing requirements. (If there isn't an edit for your needs, we can design one.)

The GCS 2100 also provides up to 99 format levels per job; up to 255 balance accumulators; variable length record and blocking factors; and up to 255 jobs stored in the system.

GCS DataTel: provides remote batch communications capabilities between the GCS 2100 systems and other 2780-compatible terminals and mainframes. And since the batch transmission of data is directly from disc to another mainframe, the usual step of transferring data to tape can be eliminated.

GCS DataTone: is a low-cost, efficient and convenient method for collecting numeric data from remote sites. It is designed for updating inventory, shipping documents, orders, etc.

DataTone answers automatically and handles up to thirty-two incoming lines at once.

With DataTone, the GCS 2100 system can accept incoming telephone data without interrupting data entry from the terminals.

GCS DataText: is a multi-purpose shared-processor approach to word processing. Designed for high-volume typing requirements, it is a fast, efficient, low-cost method for producing customized letters, envelopes, forms, labels and reports.

And since DataText uses a disc library, manual handling of storage media like cards, cartridges, etc. is eliminated.

If you'd like to get in on more Great Computer Secrets, contact Agent 2100 at General Computer Systems, Inc., 16600 Dooley Road, Addison, Texas 75001. (800) 527-2568 toll free. In Texas (214) 233-5800.

GCS 2100
GENERAL COMPUTER SYSTEMS INC.

AUSTRALIA

Authentic information is freely available **WITHOUT CHARGE** from the Australian Embassy in Washington, D.C. (202) 797-3000, and the Australian Consulate General in New York (212) 245-4000, San Francisco (415) 362-6160, Los Angeles (213) 380-4610 and Chicago (312) 329-1740.

Paper Shortage Proves COM Bureau Boon

BOSTON — The spiraling cost of paper along with its short supply has proved a blessing for the COM Service Bureau, Inc. here.

Lou Williams, president of the firm, said "the computer output microfilm (COM) business is increasing so fast we operate our

systems around the clock, seven days a week."

Williams attributed this surge also to the increase in computer usage over the past five years. Large as well as most small companies are now using computers for a great number of tasks, and the computers produce data a lot faster now, he said.

Williams' company started operating in 1970 with only one

COM unit. Today it has 34 employees, services approximately 100 computer users and has just added five new units to keep up with the additional business.

COM Service Bureau emphasizes quick service. "It's not unusual for our messengers to pick up a set of tapes at 9 p.m., convert the data to microfiche and have the completed job back by 6:00 the next morning.

The firm uses a Gould Beta

COM 700L. The unit contains a front-end minicomputer with a special-format stored program, so the customer does not have to write special instruction programs to have his data converted to microfilm.

Because of the minicomputer, Williams said, the system is capable of operating in conjunction with almost any computer output tape it receives.

"With the high cost of paper and the tremendous volume of computer data being produced daily by business, it appears that the COM business will continue to grow very rapidly," Williams concluded.

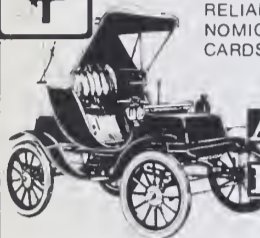
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NCR Plans Job Training for Indians

MADERA, Calif. — The Bureau of Indian Affairs will fund a program designed by NCR Corp. to train American Indians as business machine field engineers.

NCR will supply equipment and an instructor for the course, and the Bureau of Indian Affairs will handle initial recruiting and prescreening of students.

The initial pilot class with 12 students will begin this spring at the Madera Employment Training Center, a government-owned facility operated by American Indian Enterprises, Inc.

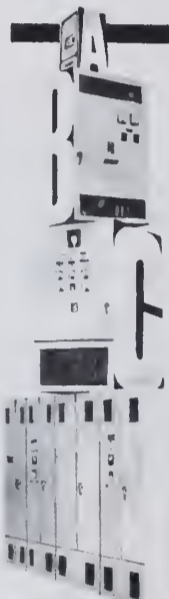
NCR anticipates training at least 250 field engineers under the program.

The 10-month course will include training in math, electronics, maintenance and repair of NCR products and courses in family financial planning and other basic human relation areas.

Upon completion of the course, students will be placed in

NCR district marketing offices within 500 miles of where they were originally recruited.

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CYBEREX

Executive Corner

■ Sycor, Inc. has named K. Dieter Heidrich and Richard A. Phillips vice-presidents.

■ David Butler has been appointed director of the Diebold Research Program-Europe, succeeding Henry F. Sherwood, who has resigned.

■ National CSS has elected Richard H. Orenstein chairman of the board of directors and Robert E. Weissman president and chief executive officer.

■ Paul Brighton and Wayne Phoenix have been named president and treasurer, respectively, of Programs and Analysis, Inc.

■ Ronald G. Piercy has been named executive vice-president of special products and Dennis D. Powers vice-president of operations at Correct Data, Inc.

■ Kalvar Corp. has named Harold C. Harsh chairman of the board of directors, Charles G. Smither vice-chairman of the board of directors, Jack S. Ward president and Robert J. Rathe a vice-president of the company.

■ Michael P. LaVigna has been promoted to corporate vice-president of marketing at On-Line Systems, Inc.

■ Philip J. Ablove has been elected to the board of directors of Redactron Corp.

■ Nat P. Turner has joined the Cullinane Corp. as vice-president.

■ Roger W. Goetz has resigned his position as executive vice-president of Computer Investors Group, Inc.

■ Jay H. Ball has been named vice-president of engineering at Kybe Corp.

■ Kas Terhorst has been appointed vice-president of planning and development of Victor Comptometer Corp.'s Business Products Group.

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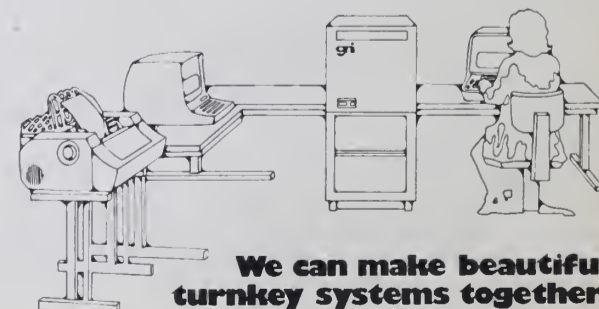
East: New York (212 682-1160), Philadelphia (215 665-1717), Union, N.J. (201 687-8700).
Midwest: Chicago (312 782-0857), Cleveland (216 771-2070), Detroit (313 352-6520), Kansas City (816 474-3393), Minneapolis (612 544-3600), St. Louis (314 862-3800).
South & Southwest: Atlanta (404 634-5127), Dallas (214 638-4080), Houston (713 626-8705), New Orleans (504 523-2576).
West Coast: Los Angeles (213 386-5500), Irvine, CA. (714 833-1730), Palo Alto (415 328-7155), San Francisco (415 434-2410).

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System 99 is a minicomputer-based multi-user business system supporting Interactive RPG II. It comes with a GRI 99/50 computer, disk, printer, and video terminal(s). It also comes fully software loaded and ready to program. And it's very competitively priced. With no trouble whatsoever, we can also configure the System 99 with other peripherals—including 80- and 96-column card equipment and magnetic tape—for both on-line interactive data entry and batch processing.

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Position Announcements

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OPERATIONS MANAGER -

Heavy experience on Univac 1100 systems. Must be a proven manager.

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Several openings at all levels of experience. (Positions available in Northern California.)

Send resume to:

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POSITION ANNOUNCEMENTS

FACULTY POSITION IN COMPUTER SCIENCE AND TECHNOLOGY

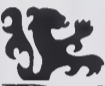
Applicants are invited to send resume for Assistant or Associate Professorships (3) in Computer Science and Computer Technology to teach in undergraduate and graduate programs. Please contact Professor R. Cheng, Dept. of Computer Science and Technology, Rochester Institute of Technology, Rochester, N.Y. 14623.

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Faculty Positions in Computer Science, State University of New York, College at Brockport
Candidates are being sought for Instructor, Assistant and Associate Professor positions to develop and teach courses in computer applications to business problems, data processing languages, operating systems, computer networks and telecommunications. Candidates must have a strong commitment to undergraduate teaching. A doctorate, teaching and practical experience are highly desirable. Send resume by March 15 to Computer Science Department, SUC at Brockport, NY 14420.

The college, an Equal Opportunity Employer, encourages women and members of minority groups to apply.

MICRO PROGRAMMER

CalComp, a leading manufacturer of computer peripheral products, has an immediate need for a Microprogrammer. This position is located at our Engineering facility in Anaheim, Calif.

Will develop functional and diagnostic microcode to control, diagnose, and test IBM compatible disk peripherals on host CPU's. Should have working knowledge of IBM 3830 and/or 3803 equivalent microcode. Individuals with a background in channel interfaced minicomputer subsystems also of interest. 2+ years experience required.

Please submit resume including salary history to Don Modie

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POSITION ANNOUNCEMENTS

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The Computer Science Program welcomes applications for the faculty position available September 1, 1975. A Ph.D. in Computer Science, Engineering or Mathematics and adequate computer related industrial experience are essential. Rank is at the Assistant Professor level; deadline is February 20, 1975. Send detailed resume to: Dr. Pei Hsia, The University of Alabama in Huntsville, Huntsville, Ala., 35807, (205) 895-6088. An Equal Opportunity/Affirmative Action Employer.

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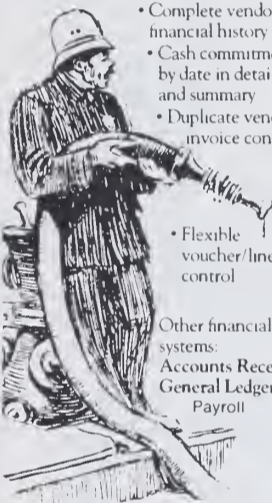
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Sperry Net Sets Record For 11th Quarter in Row

NEW YORK — Sperry Rand Corp.'s earnings continued to climb for the 11th consecutive quarter, setting records for the three- and nine-month periods ended Dec. 31.

The third-quarter earnings included a \$5.4 million gain from the sale of land.

Earnings for the period totaled nearly \$38 million or \$1.10 a share, up 28% from \$29.6 million or 86 cents a share in the year-ago period. Excluding the special credit, earnings rose 10%.

Revenues for the quarter rose 20% to \$786 million from \$653.1 million in the same 1973 period.

For the nine months, earnings totaled \$94.1 million or \$2.73 a share, up 20% over \$78.7 million or \$2.29 a share in the year-ago period. Without the special credit, earnings rose 13%.

Revenues rose 17% to \$2.2 billion compared with \$1.9 billion in the 1973 period.

Computers, farm equipment and hydraulic products provided the strongest new order performance in the third quarter, said Chairman J. Paul Lyet.

Revenues rose for all sectors of business except consumer products, which accounts for about 3% of total revenues, he added.

Backlog at Dec. 31 was a "record" \$2 billion, up 10% over last year and cancellations have not been material.

"However, we continue to be

faced with a complex business picture that involves increasing labor, materials and interest costs, and indications of softening in certain of the markets we serve because of the deepening worldwide recession," Lyet said.

"In anticipation of this situation some time ago, we began redoubling our efforts to manage assets more productively, with particular emphasis on inventory and receivables control. This emphasis is continuing in all sectors of the corporation," he added.

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Varian Group Ups Year Sales 28%

IRVINE, Calif. — Varian Associates' Information Systems Group had sales of \$42.4 million during 1974, up 28% from \$33.2 million in 1973.

Minicomputers and magnetic components shared about equally in the growth, said President Norman F. Parker. However, he added, profit margins on minicomputers continued lower than desired.

Order receipts were \$45.7 million compared with \$35.5 million in 1973. International sales accounted for over 25% of the group's 1974 volume.

The Information Systems Group accounted for 15% of Varian Associates' revenues during the year, the firm said.

Correction

Mohawk Data Sciences Corp.'s revenues from continuing operations for the six months ended Oct. 31 [CW, Jan. 8], totaled \$83.2 million compared with \$81.2 million in the same year-ago period.

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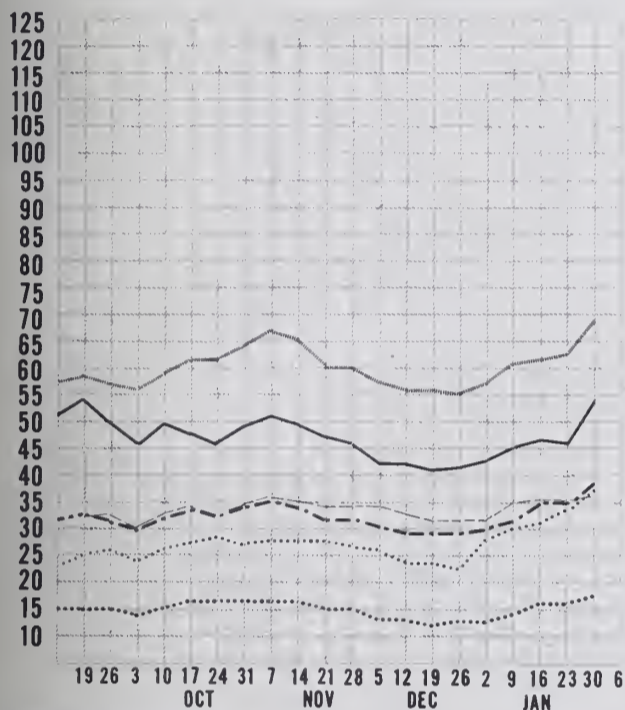
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Revenue	8,131,613	6,322,994
Earnings	957,220	693,164



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N	CONTROL DATA CORP	10- 38	13 5/8	+1 3/8	+11.2		A	APPLIED DATA RES.	1- 3	1 3/8	+ 1/8	+10.0					
N	DATA GENERAL CORP	10- 38	13 3/8	+3 5/8	+37.1		O	APPLIO LOGIC	1- 1	1/8	0	0.0					
O	DATAPoint CORP	5- 15	8 3/4	+2 1/2	+40.0		N	AUTOMATIC DATA PROC	21- 57	35 1/4	+1 3/4	+5.2					
O	DIGITAL COMP CONTROL	1- 5	1	0	0.0		O	BRANDON APPLIED SYST	1- 1	1/4	0	0.0					
N	DIGITAL EQUIPMENT	46-121	64 1/8	+11 1/4	+21.2		O	CENTRAL DATA SYSTEMS	4- 6	3	0	0.0					
N	ELECTRONIC ASSOC.	1- 3	1 3/4	0	0.0		O	COMPUTER DIMENSIONS	1- 3	1 5/8	+ 1/8	+8.3					
A	ELECTRONIC ENGINEER.	4- 11	6 3/4	0	0.0		O	COMPUTER HORIZONS	1- 5	3/8	0	0.0					
N	FOXBORO	19- 48	24 1/2	+ 3/4	+3.1		O	COMPUTER NETWORK	1- 2	1/2	0	0.0					
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N	NCR	14- 40	19	+1 5/8	+9.3		O	DATA TAB	1- 3	1 1/8	0	0.0					
N	RAYTHEON CO	21- 39	29 3/4	+ 7/8	+3.0		A	ELECT COMP PROG	1- 1	1/4	0	0.0					
N	SINGER CO	10- 40	11 3/4	+ 1/2	+4.4		N	ELECTRONIC DATA SYS.	11- 25	11 3/4	+ 1/8	+1.0					
							O	INFONATIONAL INC	1- 2	1/8	0	0.0					
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N	VARIAN ASSOCIATES	6- 13	7 1/2	+ 1/8	+1.6		O	LOGICON	2- 5	3 1/4	- 1/8	-3.7					
N	WANG LABS.	7- 20	9 1/4	+1 5/8	+21.3		A	MANAGEMENT DATA	1- 2	1 1/2	0	0.0					
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N	EDP RESOURCES	2- 5	3 5/8	+ 1/4	+7.4		O	UNITED DATA CENTER	2- 4	2 7/8	0	0.0					
O	GRANITE MGT	1- 3	7/8	+ 1/4	+50.0		A	URS SYSTEMS	2- 4	2 5/8	+ 1/8	+5.0					
A	GREYHOUND COMPUTER	2- 6	2 1/2	+ 1/4	+11.1		N	WVLY CORP	1- 5	2 1/2	0	0.0					
A	ITEL	3- 6	5	+ 1/2	+11.1												
N	LEASCO CORP	5- 12	6 7/8	+1 1/4	+22.2												
O	LEASPCORP	1- 2	1/2	0	0.0												
O	LECTRO MGT INC	1- 1	1/8	0	0.0												
O	MRG INC	1- 5	1 3/4	+ 5/8	+55.5												
A	PIONEER TEX CORP	2- 10	2 3/8	- 1/8	-5.0												
A	ROCKWOOD COMPUTER	0- 1	1/2	-	-11.1												
N	U.S. LEASING	5- 24	13 1/4	+ 3/8	+2.9												
PERIPHERALS & SUBSYSTEMS																	
							N	ADDRESSOGRAPH-MULT	3- 11	4 3/4	+ 5/8	+15.1					
							O	ADVANCE MEMORY SYS	1- 7	2 5/8	0	0.0					
							N	AMPEX CORP	2- 5	3 3/8	+ 1/2	+17.3					
							O	ANDERSON JACOBSON	1- 4	2 1/4	+ 1/2	+28.5					
							O	BEEHIVE MEDICAL ELEC	1- 7	2	- 1/8	-5.8					
							A	BOLTER-ERANEK & NEW	5- 9	5 3/4	+ 1/8	+2.2					
							N	BUNKER-RAMO	3- 8	5 1/2	+ 1/2	+10.0					
							A	CALCOMP	4- 11	4 1/2	- 5/8	-12.1					
							O	CAMBRIDGE MEMORIES	3- 16	3 1/2	+ 5/8	+21.7					
							O	CENTRONICS DATA COMP	7- 23	9 1/4	+2 3/8	+34.5					
							O	COEX CORP	8- 18	16 3/4	- 1/4	-1.4					
							O	COGNITRONICS	1- 2	3/8	0	0.0					
SUPPLIES & ACCESSORIES																	
							O	BALTIMORE BUS FORMS	4- 6	5	+ 1/2	+11.1					
							A	BARRY WRIGHT	4- 7	5 7/8	+ 5/8	+11.9					
							O	CYBERMATICS INC	1- 2	5/8	0	0.0					
							A	DATA DOCUMENTS	23- 54	33 3/4	+3 3/4	+12.5					
							O	DUPLIX PRODUCTS INC	6- 17	14 1/2	+1 3/4	+13.7					
							N	ENNIS BUS. FORMS	4- 7	5 1/2	+ 5/8	+12.8					
							O	GRAHAM MAGNETICS	5- 11	6 1/4	+ 1/2	+8.6					
							O	GRAPHIC CONTROLS	6- 11	10 1/2	+2	+23.5					
							N	JM COMPANY	43- 79	45 1/8	+ 3/4	+1.6					
							O	MOORE CORP LTO	33- 57	43 1/4	+2 3/4	+6.7					
							N	NASHUA CORP	16- 45	21 1/4	+3 1/2	+19.7					
							O	REYNOLDS & REYNOLDS	6- 35	13 1/2	+1	+8.0					
							O	STANDARD REGISTER	10- 16	14	+1	+7.6					
							O	TAB PRODUCTS CO	4- 11	6	+1	+20.0					
							N	UARC	13- 23	19 1/8	+ 1/8	+0.6					
							A	WABASH MAGNETICS	3- 7	3 7/8	+ 5/8	+19.2					
							N	WALLACE BUS FORMS	14- 24	18	+ 3/4	+4.4					
EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID (1) TO NEAREST DOLLAR																	



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